

INSTRUCTION

MANUAL

FT-625RD

FT-625R

YAESU MUSEN CO , LTD.

TOKYO JAPAN.

ALL-MODE 6M MEMORY TRANSCEIVER

FT-625RD, FT-625R



GENERAL

The FT-625RD is a high performance, all solid state transceiver for the most discriminating six meter operators. Covering the entire 50-54 MHz range in four bands of 1 MHz each, the FT-625RD features digital plus analog readout of the operating frequency on all modes of operation: SSB, CW, AM, and FM. An economy version, the FT-625R, includes a 100 kHz crystal calibrator for alignment of the analog display.

Yaesu's exciting memory system, which provides storage and recall of any transmit, receive, or transceive frequency, is an available option for your FT-625RD. Also optional is a 600 Hz CW filter which may be used in addition to the normal 2.4 kHz bandwidth for CW.

Built into every FT-625RD are an RF speech processor, a high-performance noise blanker, VOX, semi-break-in CW with sidetone, and offset tuning (clarifier) for both receive and transceive frequencies. Also included is an automatic mic gain control (AMGC), which will act as a microphone squelch to minimize transmission of random noises in the operating room.

For FM enthusiasts, the FT-625RD includes ± 1 MHz repeater split, and an auxiliary split may be used via an optional crystal. Tone burst and a discriminator center meter are included for maximum versatility.

A front panel control will vary the power output up to the maximum of 25 watts output. For energy conservation or nighttime mobile operation, the front panel lamps and digital display may be dimmed by pressing a front panel switch. Rear panel connections for relay control, ALC input, PTT (footswitch), CW key, and external speaker allow full interface with peripheral station equipment.

All circuits are fully solid state, and computer-type plug-in circuit boards are used for increased reliability and ease of maintenance. The FT-625RD is entirely self-contained, requiring only an antenna and power source for operation. The FT-625RD is normally supplied for 117 VAC (USA model) or 13.6 VDC operation, but the AC transformer may easily be rewired for operation from 100/110/117/200/220/234 VAC. Two power cords are supplied with the FT-625RD; selection of the power source is automatically made when the proper cord is inserted into the rear panel receptacle.

The transceiver weighs approximately 9 kg, and is 280 mm wide, 125 mm high, and 315 mm deep. Heavy-duty construction provides an extremely rugged package which is virtually immune to the effects of shock and vibration encountered in mobile service.

SPECIFICATIONS

GENERAL

Frequency range	: 50–51 MHz 52–53 MHz 51–52 MHz 53–54 MHz
Frequency readout	: Digital readout to 0.1 kHz, analog display resolution better than 1 kHz.
Modes of operation	: USB, LSB, CW, AM, FM.
Frequency stability	: Within 100 Hz during any 30 minute period after warmup. Not more than 20 Hz with 10% line voltage variation.
Intermediate frequencies	: First IF = 10.81 MHz Second IF = 455 kHz (AM/FM only)
Antenna impedance	: 50 ohms unbalanced
Repeater split	: 1 MHz installed, any split up to 4 MHz possible using optional crystal.
Power requirements	: AC 100/110/117/200/220/234 Volts, 50/60 Hz DC 13.8 Volts, negative ground
Power consumption	: AC Receive 35 VA DC Receive 0.7 A Transmit 135 VA Transmit 7.0 A 50% duty cycle
Size	: 280(W) x 125(H) x 300(D) mm.
Weight	: Approximately 9 kg.

RECEIVER

Sensitivity	: SSB/CW 0.5 μ V for S/N 20 dB AM 0.5 μ V for S/N 10 dB (400 Hz 30% mod.) FM 0.35 μ V for 20 dB QS
Selectivity	: SSB/CW-W : 2.4 kHz @ -6 dB, 4.1 kHz @ -60 dB *** CW-N : 600 Hz @ -6 dB, 1.6 kHz @ -60 dB AM : 4 kHz @ -6 dB, 15 kHz @ -60 dB FM : 15 kHz @ -6 dB, 32 kHz @ -60 dB *** With optional CW filter installed.
Image response	: Better than -60 dB.
Spurious response	: Better than 1 μ V at antenna input.
Audio output impedance	: 4 ohms nominal.
Audio output	: 2 watts @ 10% THD.

TRANSMITTER

Audio response	: 300–2700 Hz, –6 dB
Carrier suppression	: –40 dB or better.
Unwanted sideband suppression	: –40 dB or better.
Spurious radiation	: –60 dB or better.
FM deviation	: Factory set at ± 5 kHz.
Power output	: SSB/CW/FM 25 watts AM 8 watts

SEMICONDUCTOR COMPLEMENT

Integrated Circuits:

F4011	1	TA7060P	1
MC1496G	2	TA7063P	1
MC14011B	5	TC5032P	1
MC14069B	1	μ PC577H	1
MSM561	1	μ PC1037H	1
MSM5564	1	μ PC14305	1
MSM5576	1	μ PC14308	1
SN75453	3	μ PC14308S	1
SN76514N	1		

Germanium Diodes:

1S188FM	15	1S1007(GB)	16
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Silicon Diodes:

1S1209	1	MC301	4
1S1555	59	U05B	1
10D1	18	S15VB10	1

Silicon Varistors:

MV-103	5	MV-5W	1
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Varactor Diodes:

1S2209	16
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Field Effect Transistors:

2SK19GR	9	3SK51	2
2SK30AY	2	3SK59Y	11
3SK40M	3		

Transistors:

2SA496	1	2SC735Y	1
2SA564AR	2	2SC784R	2
2SA695D	1	2SC784BN	1
2SB529	1	2SC1815Y	41
2SC372Y	14	2SC1945D	1
2SC373	6	2SC2053	1
2SC496	7	2SC2099	2
2SC4960	1	2SD313	1
2SC710	2	2SD359	1
2SC711D	1	MJ802	1
2SC730	1	MPS-A13	1

Zener Diodes:

WZ034	1	WZ090	1
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Light Emitting Diodes:

GD4-203SRD	11
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LED Display

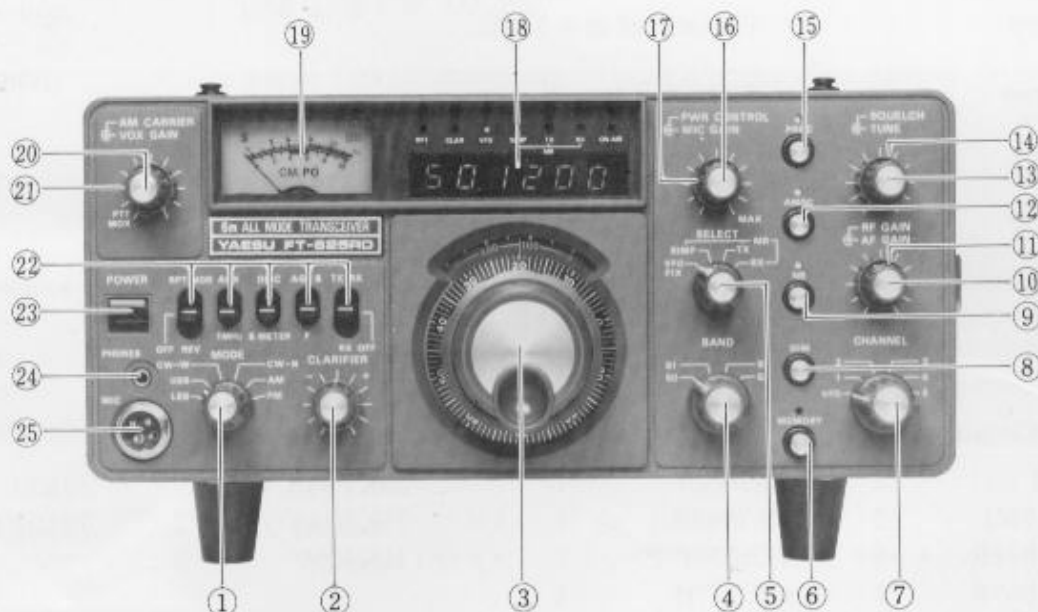
5082-7740	6
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Specifications subject to change without notice.

CONTROLS AND SWITCHES

This transceiver has been specifically designed for ease of operation and versatility. All internal controls have been carefully preset at the factory. The operator may, however, be unfamiliar with operation of some of the controls, and improper adjustment thereof may result in poor transceiver

performance. The various front panel controls and switches are described in the following section, and the operator should become familiar with the function of every control before attempting transceiver operation.



(1) MODE SWITCH

This switch chooses the mode of operation: LSB, USB, CW-W (SSB bandwidth), CW-N (using optional 600 Hz CW filter), AM, and FM.

(2) CLARIFIER

The clarifier allows offsetting of the transceiver or receive frequency ± 4 kHz from the operating frequency established by the main tuning dial.

(3) MAIN TUNING DIAL

The main tuning control is a dual rate, double-shaft mechanism which provides for both fast and slow tuning rates. The main dial skirt is calibrated in 1 kHz increments, and the analog dial window is calibrated in 100 kHz increments. Determination of the 1 MHz band segment is made by the BAND switch.

(4) BAND SWITCH

The BAND switch selects one of the four 1 MHz segments of the six-meter band.

(5) SELECT SWITCH

This switch selects frequency control between the VFO/FIX mode and memory (optional) control of the transmit, receive, or transceive frequency.

(6) MEMORY

When the optional memory unit is installed, a new frequency may be stored in memory by pressing the MEMORY switch.

(7) CHANNEL

This switch selects between VFO control or one of the 5 crystal controlled positions available per band.

(8) DIM

This switch, when pressed, dims the front panel lamps and digital display for reduced power consumption or nighttime mobile operation. In the analog FT-625R, this is the MARK switch, which actuates the 100 kHz crystal calibrator.

(9) NB

This switch, when pressed, activates the noise blanker for elimination of pulse-type noise.

(10) AF GAIN

The AF GAIN control adjusts the audio output to the speaker and headphones. Clockwise rotation increases the audio output level.

(11) RF GAIN

The RF GAIN control varies the gain of the receiver RF and IF amplifiers. Maximum sensitivity is obtained when the control is set to the fully clockwise position.

(12) AMGC

The Automatic Mic Gain Control acts as a "microphone squelch" to prevent output from the microphone amplifier stage unless a preset level of input from the microphone is present. Thus, minor noises can exist in the operating room without their going on the air.

(13) TUNE

The TUNE control peaks all transceiver circuits for the frequency being used.

(14) SQUELCH

This control adjusts the FM receiver squelch threshold level.

(15) PROC

This switch activates the RF speech processor.

(16) MIC GAIN

This control varies the output from the microphone amplifier stage for AM and SSB operation, and it has sufficient range to permit the use of any quality dynamic microphone having an impedance of 500 to 600 ohms.

(17) PWR CONTROL

This control is used to vary the output from the transmitter.

(18) DIAL AND DISPLAY

Frequency readout is by means of the digital and analog displays. The digital display reads out all digits of the operating frequency, with resolution to 100 Hz. The analog sub-dial is calibrated every 100 kHz, and the BAND switch and main dial skirt are used to establish the precise operating frequency.

(19) METER

The meter reads out signal strength or FM discriminator center current on receive, and relative power output on transmit.

(20) VOX GAIN

The VOX GAIN control selects between PTT and MOX (manual transmit) operation, as well as setting the VOX sensitivity.

(21) AM CARRIER

This control sets the AM carrier level.

(22) SWITCHES

RPT NOR/REV

This switch is used for operation on non-standard repeaters. In the NOR position, the transmit frequency is shifted 1 MHz lower. In the REV position, the receive frequency is shifted 1 MHz lower.

AUX/1 MHz

This switch selects the normal 1 MHz repeater split or an auxiliary split established by means of an optional crystal.

DISC/S METER

This switch selects between meter indication of discriminator center current or signal strength on receive.

AGC F/S

This switch selects between fast or slow AGC response.

CLARIFIER

The CLARIFIER switch selects between transceive (TX RX) or receive (RX) frequency offset using the clarifier control. In the center (horizontal) position, the clarifier is turned off.

(23) POWER

This is the main ON/OFF switch for both AC and DC operation.

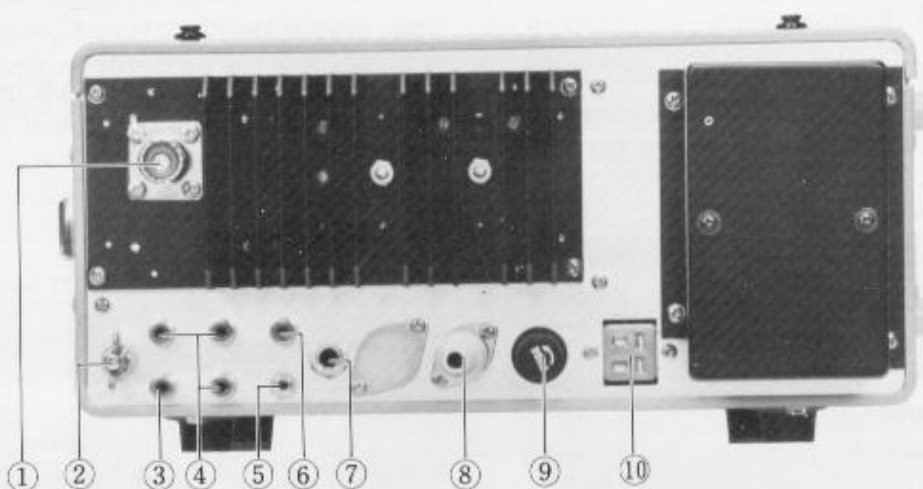
(24) PHONES

This is a miniature phone jack for use of headphones or a speaker. The internal speaker is disabled when a plug is inserted into this jack.

(25) MIC

This is a four-conductor jack for microphone and PTT connections.

REAR PANEL CONNECTIONS



REAR PANEL CONNECTIONS

(1) ANT

UHF female coaxial connector for antenna input.

(2) GND

Ground connection.

(3) ALC

ALC (automatic level control) input from linear amplifier, etc.

(4) RELAY CONNECTIONS: COM, MAKE, BREAK

These are relay connections for control of station equipment.

(5) SP

External speaker audio output. Audio output impedance is 4 ohms.

(6) PTT

This is used for activating the transceiver push-to-talk circuitry, should the operator be using a foot-switch, etc. This jack is in parallel with the mic jack PTT connection as well as the TONE IN PTT connection.

(7) KEY

Key jack for CW operation.

(8) TONE IN

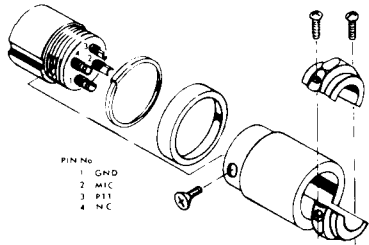
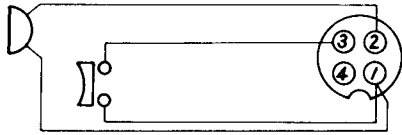
This is a tone pad input jack. Refer to the drawing for tone input, speaker, PTT, and DC connections.

(9) FUSE

Fuse holder. For AC operation, a 3 amp fuse is used on 100/110/117 volts, and a 2 amp fuse is used for 200/220/234 volt operation. For DC operation, a 10 amp fuse is located in the DC power cord. When replacing fuses, be certain to replace the blown fuse with one of the proper rating. **WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT.**

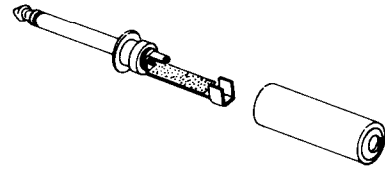
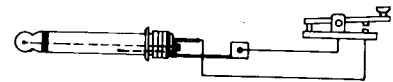
(10) POWER

Both AC and DC cables are connected to this receptacle. They are both supplied with the transceiver.

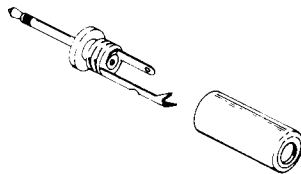


PIN No.
 1 GND
 2 MIC
 3 PTT
 4 NC

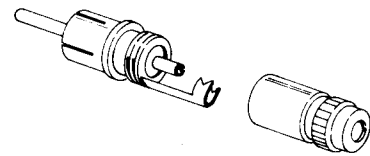
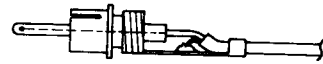
Microphone Connector



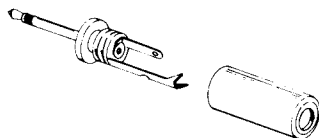
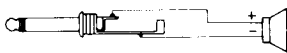
Key Plug



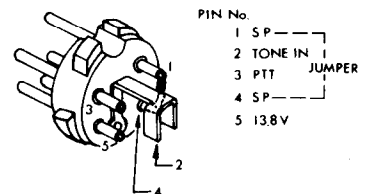
Headphone Plug



Phono Plug



Speaker Plug



Tone In Plug

INSTALLATION

GENERAL

The FT-625RD has been designed primarily for base station service, requiring only an antenna and power source. However, the transceiver provides for efficient mobile operation. The FT-625RD has been factory pre-tuned, and requires no alignment for operation into a 50 ohm load.

The antenna and its location are of critical importance in both fixed and mobile operation. In many cases, communications effectiveness is directly related to antenna height. The antenna should be as high and in the clear as possible, and a minimum separation of 5 feet should be maintained between VHF and other antennas. In mobile operation, it is desirable to locate the antenna as far away from the engine as possible, so as to minimize noise pickup from the ignition system.

For base station operation, the most popular antennas for DX work are the various multielement Yagi arrays, used singly or in stacked systems. Most DX work is done using horizontal polarization, while mobile antennas invariably are vertical. If much work is done with FM and/or mobile stations, some sort of vertical antenna should be used to avoid cross-polarization loss of signal.

To minimize loss in the antenna system, do not economize on coaxial cable, and use the shortest length of cable which is practicable, avoiding sharp angles or kinks. Type RG8A/U is suitable for line

lengths exceeding 25 feet, while type RG58A/U may be used for mobile installations. For extremely long runs, type RG-17A/U, air-dielectric "heliac", or aluminum-jacketed foam-dielectric coax may be required. If you are using an amplifier with this transceiver, check the coaxial cable manufacturer's specifications to make sure that it is capable of handling your power level.

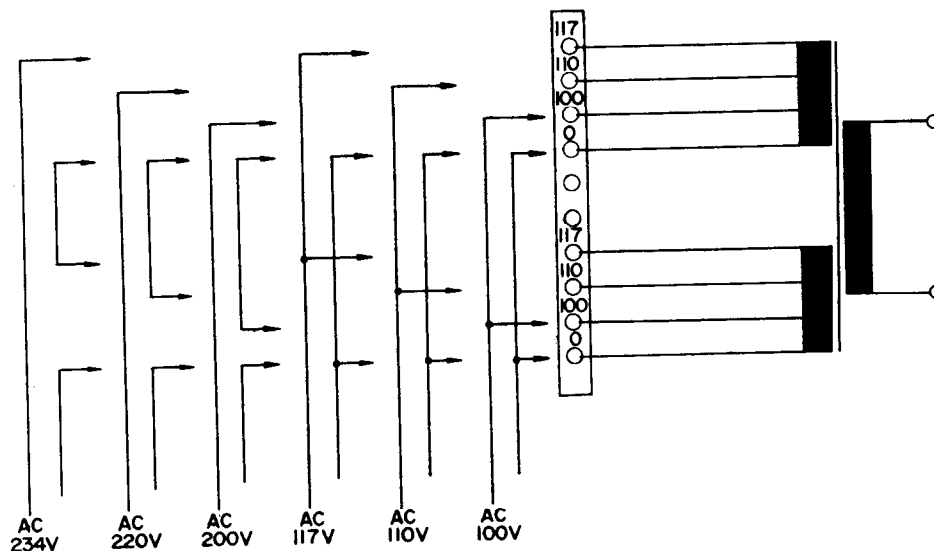
BASE STATION INSTALLATION

The FT-625RD is designed for use in many parts of the world, where the AC supply voltage may differ from the operator's local supply voltage. Therefore, **before connecting the AC cord to the power outlet, be absolutely certain that the voltage marked on the rear of the transceiver agrees with the local AC supply voltage.** If not, please refer to the transformer primary winding chart for the proper connections.

CAUTION

PERMANENT DAMAGE WILL RESULT IF IMPROPER AC SUPPLY VOLTAGE IS APPLIED TO THE TRANSCEIVER. OUR WARRANTY DOES NOT COVER THE DAMAGE CAUSED BY APPLICATION OF IMPROPER SUPPLY VOLTAGE.

Be sure that a proper fuse is used for the local supply voltage. For 100/110/117 volts, use a 3 amp fuse, and for 200/220/234 volts, use a 2 amp fuse.



POWER TRANSFORMER PRIMARY CONNECTIONS

CAUTION

IMPROPER FUSE REPLACEMENT CAN CAUSE PERMANENT DAMAGE IN THE EVENT OF UNUSUAL OPERATING CONDITIONS. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER FUSE REPLACEMENT.

The transceiver should be connected to a good ground through a heavy braided cable. The ground lead should be connected to the terminal marked GND on the rear panel.

It is recommended that excessively warm locations be avoided. The transceiver should be situated so that adequate air circulation through cabinet openings is possible.

MOBILE INSTALLATION

The transceiver will operate satisfactorily from any 12 volt negative ground battery source by connecting the DC power cord to the rear panel receptacle. In the car, a location should be selected that is clear of heater ducts to protect it from excessive heat. No special mounting precautions need to be observed if adequate ventilation is available. A minimum of two inches of air space is recommended to allow proper air flow around the transceiver. You may put it on the seat but be sure there is clearance between the cabinet bottom and the seat. Since the transceiver requires an average of 7 A on transmit, the fuse in the DC power cable should be rated for 10 amps.

When making connections to the car battery, be certain that the RED lead is connected to the positive (+) terminal and the BLACK lead is connected to the negative (-) terminal of the battery. Reversed connections could permanently damage the transceiver. The power cable should be as short as possible, and should be connected to the battery so as to take advantage of the filtering action of the battery.

Prior to operating the transceiver in a mobile installation, the voltage regulator setting should be checked. In many vehicles, the voltage regulation is very poor, and in some cases the regulator may be set for an excessively high charging voltage. As the battery and regulator age, the maximum voltage while charging can increase

to a very high level. This is not only detrimental to the battery, but it may damage the transceiver. The transceiver is designed to operate from a source voltage of 11–16.5 volts. It is desirable to set the regulator so that the highest charging voltage does not exceed 14 volts, so as to give a margin of safety. The transceiver should be switched OFF when the vehicle is started so as to prevent voltage transients from damaging the transistors.

It is recommended that the microphone furnished with this transceiver be used; however, any quality microphone of 500–600 ohm impedance may be used. Refer to Fig. 2 for the microphone plug wiring connections. The microphone bracket may be put on the side of the cabinet, or at any other convenient place by drilling two 2.5 mm holes spaced 13 mm.

A speaker is built into the transceiver. However, audio output is also available for use with an external speaker. Any speaker having an impedance of 4 ohms may be used. When an external speaker plug is inserted in the EXT SP jack on the rear panel, the internal speaker is disabled.

OPERATION

The tuning procedure for this transceiver is not complicated. However, care should be exercised in operation to secure peak performance. The following paragraphs describe the procedure for receiver and transmitter tuning.

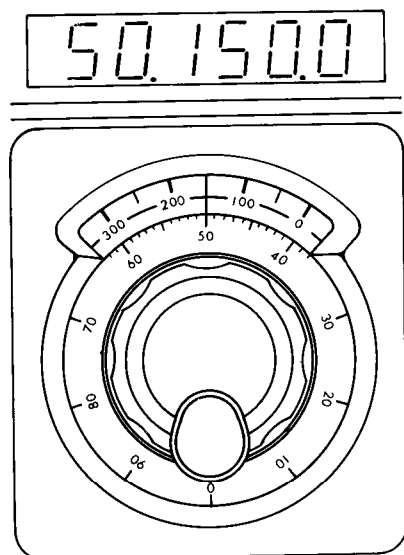
INITIAL CHECK

Before connecting the transceiver to a power source, carefully examine the unit for any visible damage. Be sure that all modules and crystals are firmly in place, and that all controls and switches are operating normally. Be certain that the voltage specification marked on the rear panel matches the supply voltage.

FREQUENCY READOUT

The digital display indicates all digits of the operating frequency, with resolution to 0.1 kHz.

The analog display consists of three components: the bandswitch, the analog dial window, and the main tuning dial skirt. For example, let us say that it is desired to operate on 50.150 MHz. The bandswitch should be rotated to the "50" position; the main dial should then be rotated so that the dial window reads half way between "100" and "200", and so that the dial skirt indicates "50". By changing the position of the bandswitch, this positioning of the main dial will also yield 51.150, 52.150, and 53.150 MHz.



RECEIVER

After the transceiver is properly set up for operation, preset the controls and switches as follows:

POWER	Down to OFF position
MODE	Desired mode
BAND	Desired band segment
RPT	Lever horizontal to OFF position
AUX/1 MHz	Lever position horizontal to 1 MHz
DISC	Lever position horizontal to S METER
CLAR	Lever position horizontal to OFF
MAIN TUNING DIAL .	Desired operating frequency
VOX GAIN	PTT
AF GAIN	12 o'clock position
RE GAIN	Fully clockwise
SELECT	VFO/FIX
CHANNEL	VFO
SQUELCH	Fully counter-clockwise
PROC	OFF (Not pushed)
AMGC	OFF (Not pushed)
NB	OFF (Not pushed)
MIC GAIN	Full counter-clockwise
AM CARRIER	Fully counter-clockwise

Reconfirm that the voltage specification on the back panel of the transceiver matches your local supply voltage. Connect the appropriate power cord to the power source, and connect an antenna to the antenna receptacle on the rear panel.

Turn on the POWER switch. The dial and meter lamps and the digital display should be illuminated. The transceiver is now ready to operate. Peak the TUNE control for maximum receiver background noise; this will also peak the transmitter circuits for maximum power output.

(1) SSB and AM Modes

Using the main tuning dial, tune in an SSB signal. Upper sideband (USB) is almost universally accepted for 6 meter operation, but if a station cannot be tuned in, try switching to LSB. The AF GAIN control should be adjusted for a comfortable listening level, and the RF GAIN should, usually,

be set to the fully clockwise position. If, however, the incoming signal is very strong, or if you are trying to copy a weak station adjacent to a strong one, reducing the RF GAIN somewhat may improve reception. When pulse-type noise is encountered, such as that from an automobile ignition system, press the NB (noise balancer) switch. For AM, tune for a natural sounding voice.

(2) CW Mode

With the CLARIFIER in the OFF position, tune in a CW signal. When the incoming signal is tuned to a beat note of 800 Hz, your transmit frequency will coincide with that of the other station. When the optional 600 Hz CW filter is installed, selection of wide or narrow bandwidths may be made by placing the MODE switch in the CW-W or CW-N position, respectively.

(3) FM Mode

Using the main tuning dial, tune in an FM signal for maximum and steady S-meter reading and a clear, natural voice output from the speaker. For accurate tuning, set the meter switch to the DISC position, and carefully adjust the tuning control until the pointer is vertical (zero on the discriminator scale).

If the S-meter wobbles, or if it is impossible to obtain clean audio, it is possible that the incoming signal is on another mode, such as SSB.

FREQUENCY CALIBRATION

(1) FT-625RD (Digital plus Analog Model)

The digital display is automatically calibrated, and no further adjustment is needed. The analog dial skirt should be rotated so that it coincides with the frequency shown on the digital display.

(2) FT-625R (Analog Model)

A. SSB/CW Modes

Activate the MARK switch, rotate the main tuning dial to the nearest 100 kHz point, and tune in the marker signal for a zero beat (lowest pitch frequency). Though it is very difficult to hear the zero point, some fine adjustment and careful listening will yield the zero beat. Rotate the dial skirt to align the "0" calibration with the vertical calibration marking. The transceiver must be recalibrated when changing modes, USB/CW to LSB.

B. AM Mode

Activate the MARK switch, and rotate the main tuning dial to the nearest 100 kHz point. Tune in the marker signal for a maximum S-meter reading. Rotate the dial skirt to align the "0" calibration with the vertical calibration marking.

C. FM Mode

Place the meter switch in the DISC position. Activate the MARK switch, and rotate the main tuning dial to the nearest 100 kHz point. Tune in the marker signal for a vertical indication of the meter pointer (zero on the discriminator center meter). Rotate the dial skirt for calibration at the "0" point, as in previous sections.

NOTE: WHEN THE MARKER SWITCH IS ACTIVATED, THE ANTENNA IS AUTOMATICALLY DISCONNECTED FOR EASIER CALIBRATION. THE LAMPS WILL ALSO BE DIMMED DURING CALIBRATION; THIS IS ENTIRELY NORMAL.

TRANSMITTER

Connect a 50 ohm dummy load or matched antenna to the coax fitting on the rear panel. If the TUNE control has been adjusted for maximum receiver noise, no further adjustment is needed for full transmitter output. The adjustment of the TUNE control for maximum output is very broad.

For adjustment of the power output level, the PWR CONTROL may be rotated as required. While this control is normally set fully clockwise, this control allows the operator to control the transmitter output level as needed.

(1) SSB Mode

The MIC GAIN control should be adjusted while speaking in a normal voice a long syllable such as the word "four". The SSB MIC GAIN should only be advanced to the point where the power output does not increase further. Excessive advancement of the gain control will result in splatter and distortion, thus reducing intelligibility. The microphone PTT switch may be used, or the VOX circuitry may be utilized (see part (5) of this section).

(2) AM Mode

Place the MODE switch in the AM position, and press the microphone PTT switch. Advance the AM CARRIER control until a reading of 7 on the meter PO scale is attained. Speaking in a normal voice, advance the MIC GAIN control until a slight movement of the PO needle is noted on voice peaks.

(3) CW Mode

Plug a key into the KEY jack on the rear panel. In the key-down condition, the meter will indicate between 6 and 8 on the PO scale, at full transmitter output. For semi-break-in operation, advance the VOX GAIN control until the sidetone oscillator activates the VOX relay when the key is closed. For PTT operation, rotate the VOX GAIN control to the PTT position. Keying is accomplished by closing a DC 8 V line to ground. Key down current is approximately 8 mA. Use caution when using an electronic keyer so as to avoid damage caused by reversed polarity.

(4) FM Mode

Push the microphone PTT switch while speaking into the microphone in a normal voice. All gain controls are set automatically for FM operation. The relative output meter should read between 6 and 8 at full output.

(5) VOX (Voice Controlled) Operation

Adjust the VOX GAIN control on the front panel until your voice activates the transmitter while you are speaking into the microphone in a normal voice. Set the antitrip control, VR₄₀₂, which is located on the AF AMP UNIT, to the minimum point that prevents speaker output from tripping the VOX. Do not use more VOX GAIN nor antitrip than necessary. Adjust the DELAY control VR₄₀₁ for the desired VOX release time. The DELAY control is also located on the AF AMP UNIT.

(6) PTT Operation

Push-to-talk operation is accomplished by rotating the VOX GAIN control to the PTT position (but not into the click-stop, which is the MOX position). The PTT circuit may then be activated either by the microphone PTT switch or by a footswitch. If a footswitch is used, it may be connected through the rear panel PTT jack.

MEMORY OPERATION (With optional MEMORY UNIT installed)

The memory circuitry can be used to store any frequency within a 1 MHz band segment for recall and control of the transceiver, receive, or transmit frequency. A frequency is memorized by pressing the MEMORY button, and the frequency is recalled by positioning the SELECT switch as needed.

In the SIMPLEX position, the transceiver frequency is locked on the memorized frequency.

In the TX MR position, the transmitter is locked on the memorized frequency, while the receiver is controlled by the main VFO (or FIX unit).

In the RX MR position, the receiver is locked on the memorized frequency, while the transmitter is controlled by the VFO.

Caution should be observed during repeater operation. If the SELECT switch is in the TX MR position, and the RPT switch is in the NOR position, the 1 MHz shift will be applied to the memorized frequency (which is recalled only for transmission). Unless the operator is careful, an unwanted repeater may be activated, causing interference to other users.

Optional batteries inserted into the MEMORY UNIT will allow the memorized frequency to be held, even though the FT-625RD is turned off.

For most repeater work, the memorized repeater frequency can be recalled by placing the SELECT switch in the SIMPLEX position, and placing the RPT switch in the NOR position. The main VFO may then be turned to another repeater or calling frequency; return to the VFO frequency is performed by placing the SELECT switch in the VFO/FIX position. Alternatively, the repeater input frequency may be memorized and recalled by placing the SELECT switch in the TX MR position. The VFO can then be tuned to the repeater output frequency, and the RPT switch should be turned OFF.

REPEATER OPERATION

The transmit frequency may be shifted 1 MHz for repeater operation. When the RPT switch is in the NOR (normal) position, the transmit frequency is shifted 1 MHz lower than the receive frequency. When the RPT switch is placed in the REV (reverse) position, the receive frequency is shifted 1 MHz lower. Extreme caution should be exercised so as not to transmit outside the amateur bands when using the RPT switch.

In some areas, repeater splits other than 1 MHz have been authorized. In this case, an optional crystal may be installed in the local unit to provide repeater splits of up to 4 MHz. The AUX/1 MHz switch must be placed in the AUX position for actuating the optional crystal.

Determination of the AUX crystal frequency is made as follows:

Band 51 (51.0–52.0 MHz)

(71.01 – Shift frequency)

Band 52 (52.0–53.0 MHz)

(72.01 – Shift frequency)

Band 53 (53.0–54.0 MHz)

(73.01 + Shift frequency)

Example

Calculate the crystal frequency for –1.2 MHz shift in the 53 MHz band segment (TX frequency 1.2 MHz lower):

$$73.01 - 1.2 = 71.81$$

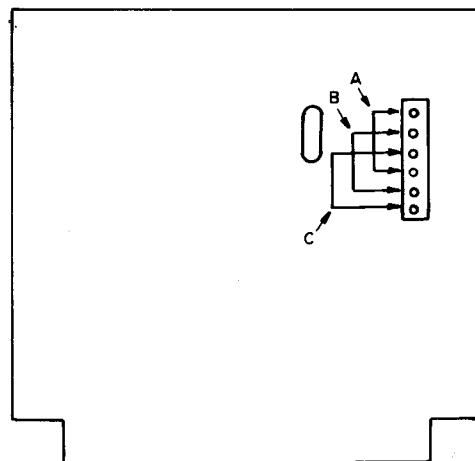
When the optional memory unit is installed, the output frequency of the repeater may be stored by pressing the MEMORY button and placing the SELECT switch in the SIMPLEX position. By placing the RPT switch in the NOR or REV positions, the desired offset will occur. If the repeater input and output frequencies are within the same 1 MHz width of the BAND switch, the input frequency may be stored in memory, and then recalled for transmission only by placing the SELECT switch in the TX MR position. The VFO can then be tuned to the output frequency of the repeater. In this way, “oddball” splits can be accommodated.

Tone actuated repeaters can be accessed by means of the built-in tone burst generator, which is activated by pressing the BURST switch on the front panel. With this button depressed, pushing the microphone PTT switch will cause insertion of the burst signal at the beginning of each transmission.

The audio frequency of the tone burst signal may be programmed for any frequency between 671 and 2900 Hz, by use of a crystal and by positioning the selector plug on the tone burst unit. The U.S. model normally is set up for 1800 Hz operation. The chart shows the relation between the position of the selector plug, the crystal frequency, and the tone frequency.

Tone Frequency (Hz)	Multiplier	Plug Position	Crystal Frequency (kHz)
671–1342	4096	A	2750–5500
1343–2685	2048	B	2750–5500
2686–2900	1024	C	2750–2970

Crystal frequency = Tone frequency × Multiplier.



CRYSTAL CONTROLLED OPERATION

In addition to normal VFO operation, five crystals may be selected by the channel switch on the front panel for crystal controlled operation. Such operation is often useful for operation on favorite calling or repeater frequencies. Since the 6 meter band is divided into four segments in the FT-625RD, these five crystals could provide for operation on 20 different frequencies.

BAND (MHz)	f ₁			
	LSB(MHz)	USB(MHz)	FM (MHz)	AM·CW (MHz)
50	59.2015	59.1985	59.2	59.1993
51	60.2015	60.1985	60.2	60.1993
52	61.2015	61.1985	61.2	61.1993
53	62.2015	62.1985	62.2	62.1993

Table 1

The crystal holders accept standard HC-25/U type crystals. All crystal frequencies must fall between 8,200 kHz and 9,200 kHz. A trimmer capacitor is connected in series with each crystal to permit fine tuning of the crystal frequency; Adjustment of this trimmer will move the crystal frequency approximately 1 kHz.

The correct crystal frequency for any desired operating frequency may be determined by using the following formula:

$$f_x = f_1 - f_0$$

where f_x = crystal frequency

f_0 = operating frequency

f_1 = a constant shown in Table 1

Example: Calculate the required crystal frequency for 50.105 MHz CW operation.

$$f_x = f_1 - f_0 = 59.1993 - 50.105 = 9094.3 \text{ kHz}$$

It can be seen from the chart that a crystal for 50.51 MHz FM can also be used for 51.51, 52.51, and 53.51 MHz FM by changing the position of the BAND switch.

CW FILTER INSTALLATION

- 1) Remove the top cover by releasing the fasteners marked "A" in Figure 1. Slowly lift the cover, and remove the speaker lead, marked "B", from the speaker lugs.
- 2) Remove the plate marked "C" as shown in Figure 1.
- 3) Remove the screws marked "D" in Figure 1, and carefully remove the Filter Unit from its edge connector.
- 4) Install the CW filter on the Filter Unit as shown in Figures 2 and 3. Slide the mounting lug and leads into the holes on the circuit board, make the mounting nut snug, and solder the two leads to the circuit board, as shown in Figure 2.
- 5) The jumper shown in Figure 3 must be moved to the position shown in the drawing.
- 6) Replace the circuit board, covering plate, speaker lead, and the top cover of the transceiver. Installation is now complete.

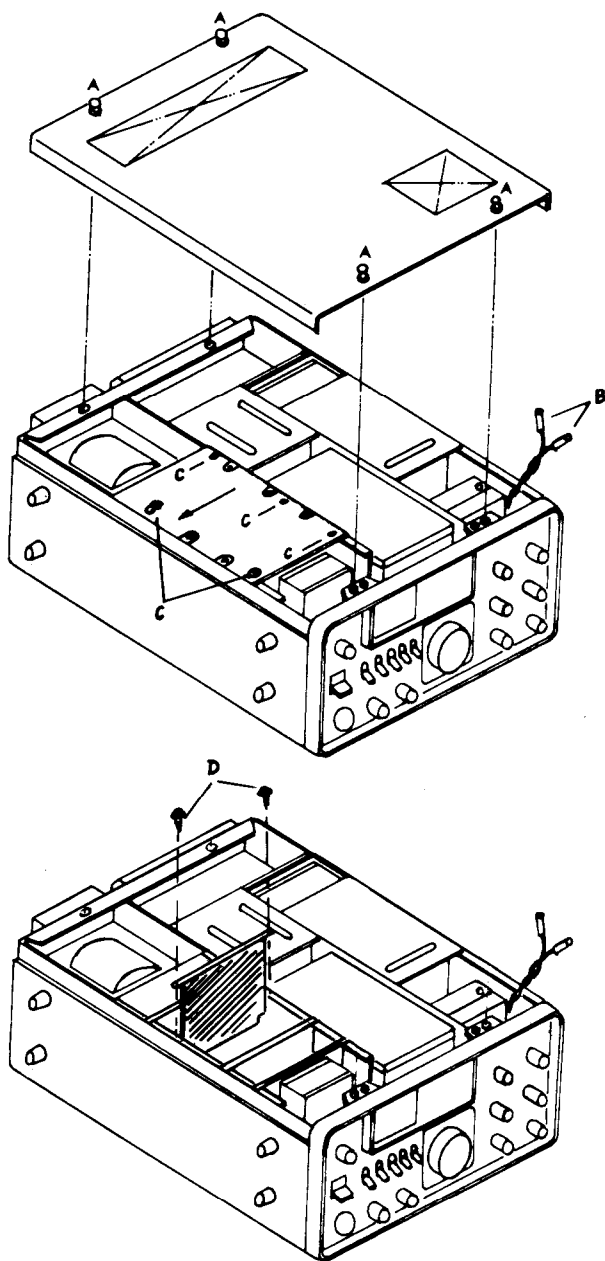


Fig. 1

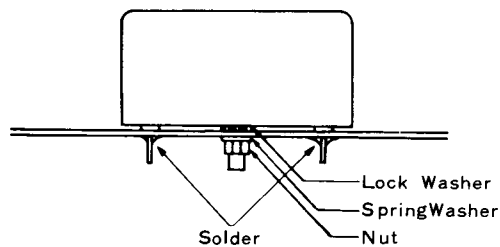


Fig. 2

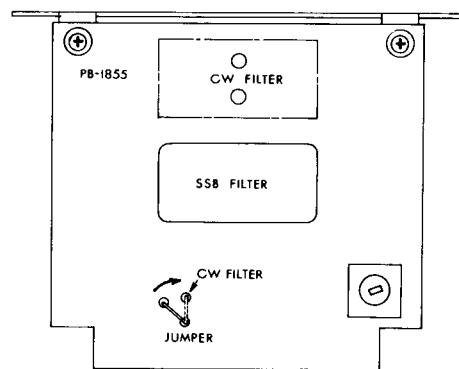
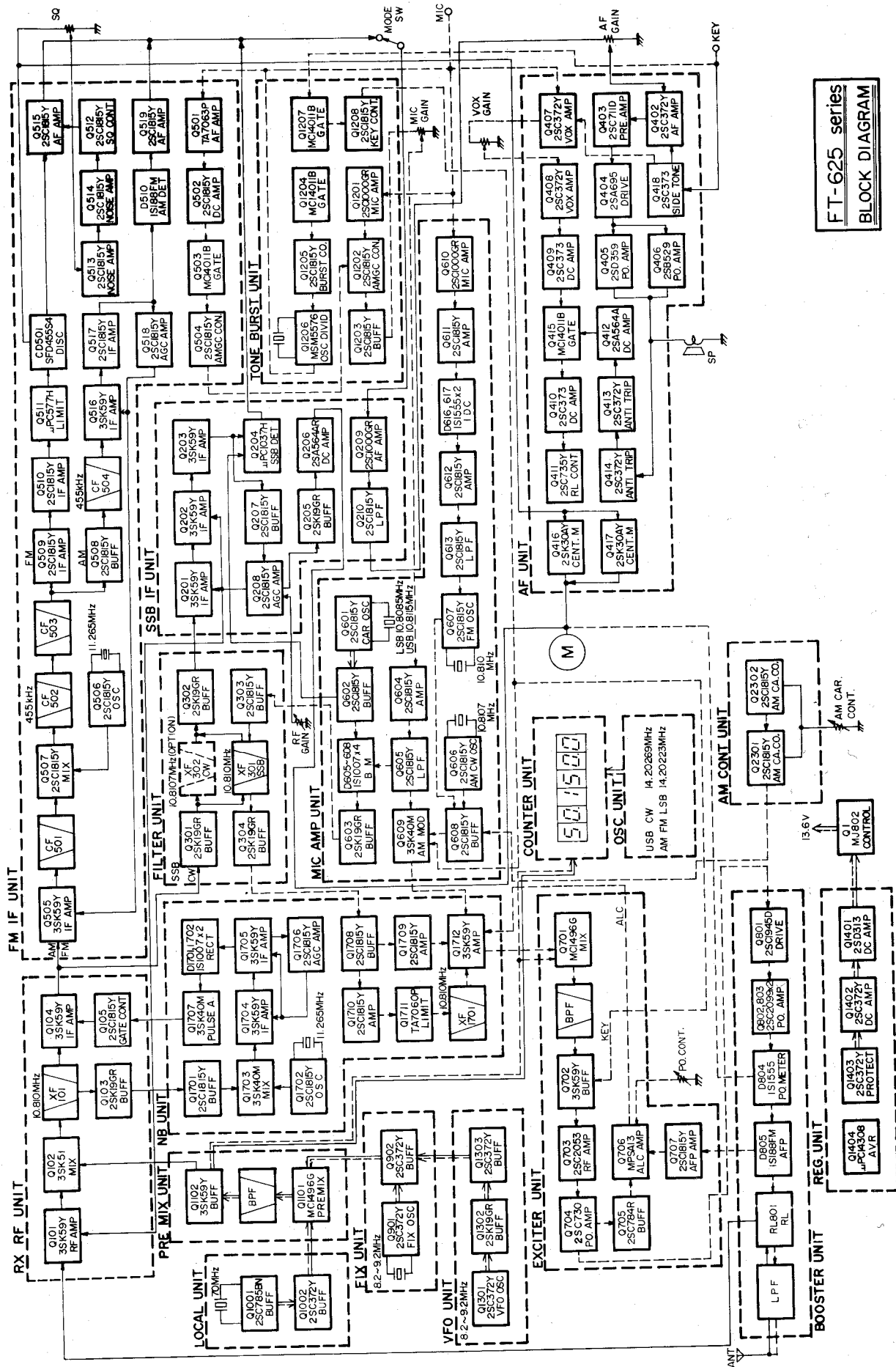


Fig. 3



**FT-625 series
BLOCK DIAGRAM**

CIRCUIT DESCRIPTION

GENERAL

The block diagram and the following circuit description will provide you with a better understanding of this transceiver. The discussion will be on a module-by-module basis, in the interest of clarity.

Each circuit board has its own parts numbers, beginning, usually, with the number 01. For example, RF amplifier transistor type 3SK59Y on PB-1853 is Q101.

The FT-625RD utilizes single conversion on SSB and CW, with a 10.81 MHz IF. On AM and FM, double conversion is used, with a 455 kHz second IF.

RECEIVER

RF UNIT (PB-1853)

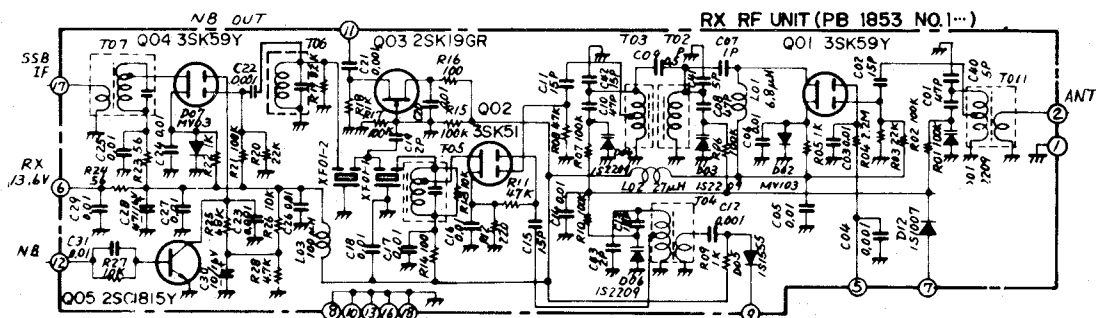
The 50 MHz signal from the antenna is switched from the BOOSTER UNIT (PB-1859), where the input signal has passed through a lowpass filter (L810, L811, C825-C827), to pin 2 of the RF UNIT. The signal is amplified by RF amplifier Q101 (3SK59Y) and fed to gate 1 of the first mixer, Q102 (3SK51). The input and output circuits of the RF amplifier utilize a double tuned circuit, which is sharply tuned to the center of the band by varactor diodes D101, D103, and D104 (1S2209), thus minimizing cross modulation and intermodulation effects.

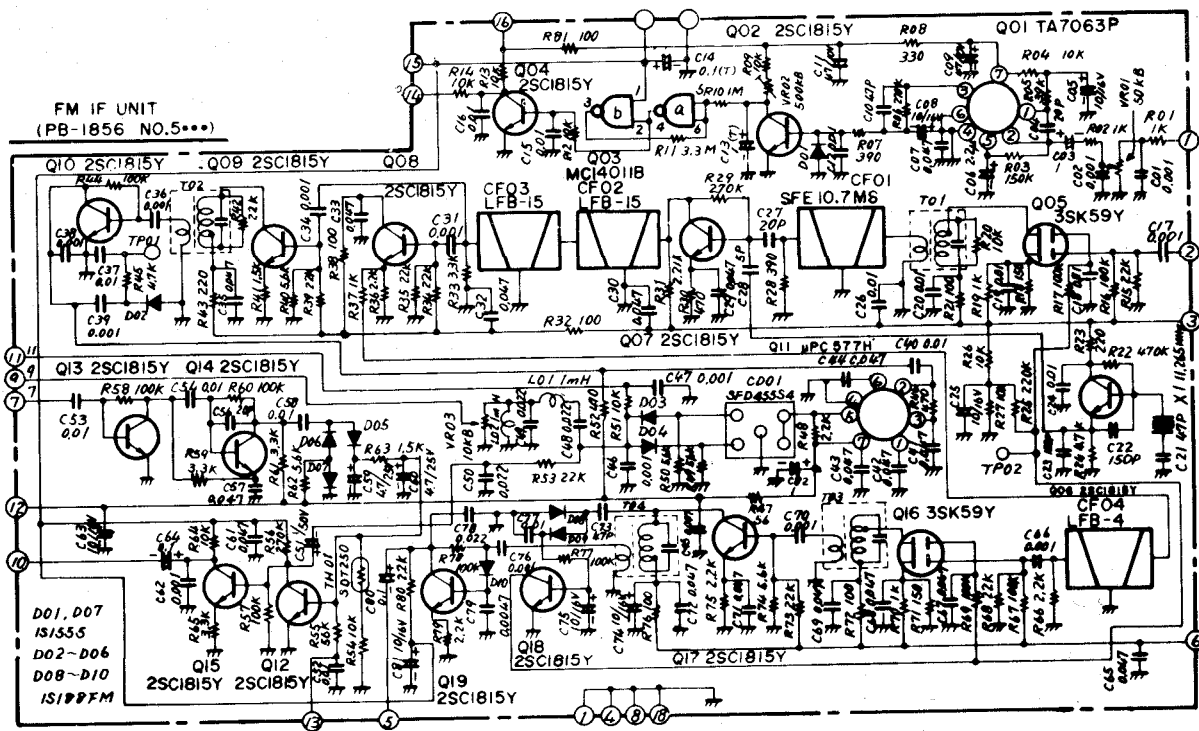
A local signal is generated in the PREMIX UNIT (PB-1861), filtered by T104, C113, and D106 (1S2209), and fed to gate 2 of Q102. Here the 60.81-64.81 MHz local signal is mixed with the 50-54 MHz incoming signal, producing a 10.81 MHz IF. The IF signal is passed through crystal filter XF101, which has a 3 dB bandwidth of 30 kHz, and is amplified by IF amplifier Q104 (3SK59Y). The SSB and CW signals are fed to the FILTER UNIT, while AM and FM signals are fed to the FM IF UNIT.

FM IF UNIT (PB-1856)

The FM or AM signal delivered from the RF UNIT is fed to pin 7 of the FM IF UNIT. The signal is amplified by IF amplifier Q505 (3SK59Y), and delivered to ceramic filter CF501, which has bandwidth of 300 kHz. From here the signal is fed second mixer Q507 (2SC1815Y), where the IF signal is mixed with an 11.265 MHz signal generated by second heterodyne oscillator Q506 (2SC1815Y), thus producing a 455 kHz second IF. The second IF signal is passed through ceramic filters CF502 and CF503.

An FM signal is amplified by IF amplifiers Q509 and Q510 (2SC1815Y), and fed to amplifier limiter Q511 (μ PC577H), which removes any amplitude modulation component of the signal. The signal is then passed to ceramic discriminator CD501 (SFD455S4), which produces an audio output in response to a corresponding frequency or phase shift in the 455 kHz IF signal. The output of CD501 is amplified by Q515 (2SC1815Y) and delivered to the AF UNIT.



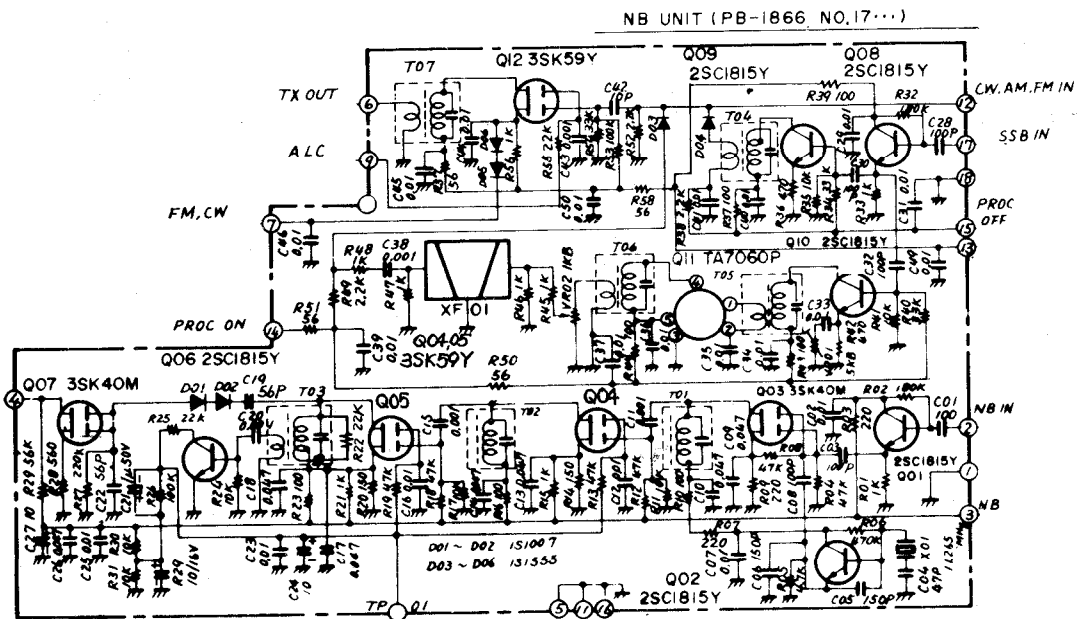


An AM signal is amplified by buffer amplifier Q₅₀₈ (2SC1815Y), passed through ceramic filter CF₅₀₄, and amplified by IF amplifiers Q₅₁₆ (3SK59Y), and Q₅₁₇ (2SC1815Y). The output of Q₅₁₇ is detected by AM detector D₅₁₀ (1S188FM), amplified by Q₅₁₉ (2SC1815Y), and passed to the AF UNIT.

A portion of the output of Q₅₁₇ is detected by D₅₀₈ and D₅₀₉ (1S188FM), amplified by Q₅₁₈ (2SC1815Y), and then fed to the second gates of Q₅₀₅ and Q₅₁₆ for AGC (Automatic Gain Control) purposes.

NB UNIT (PB-1866)

SSB and CW signals from XF₁₀₁ on the RF UNIT are amplified by buffer amplifier Q₁₀₃ (2SK19GR) and delivered to pin 11 of the NB UNIT. The 10 MHz IF signal is amplified by buffer amplifier Q₁₇₀₁ (2SC1815Y) and fed to noise blanker mixer Q₁₇₀₃ (3SK40M); here the 10.7 MHz IF signal is mixed with a local signal generated by Q₁₇₀₂ (2SC1815Y), producing a 455 kHz noise blanker IF. This signal is amplified by Q₁₇₀₄ and Q₁₇₀₅.



When a carrier or noise-free modulated signal is received, the 455 kHz signal is rectified by D₁₇₀₁ and D₁₇₀₂ (1S1007), charging C₁₇₁₉. There is no discharge loop for C₁₇₁₉; therefore, signals which exceed the charged voltage established by the reference voltage on C₁₇₁₉ will not pass through D₁₇₀₁ and D₁₇₀₂. Accordingly, there will be no voltage drop across R₁₇₂₇, and Q₁₇₀₇ (3SK40M) will conduct as the gate voltage approaches zero. When Q₁₇₀₇ conducts, the voltage applied to the base of Q₁₀₅ (2SC1815Y) will drop. As the drain voltage of Q₁₇₀₇ drops, the base voltage of Q₁₀₅ drops, turning the latter off. The collector voltage will then increase, producing a forward bias to gate 2 of IF amplifier Q₁₀₄, allowing normal operation of Q₁₀₄.

When pulse noise is received which exceeds the charged reference voltage established by C₁₇₂₀, D₁₇₀₁ and D₁₇₀₂ will permit negative-going pulses to turn Q₁₇₀₇ off. The drain voltage will increase rapidly as it turns off.

When no carrier is present in the 455 kHz IF, the noise at the discriminator output is amplified by

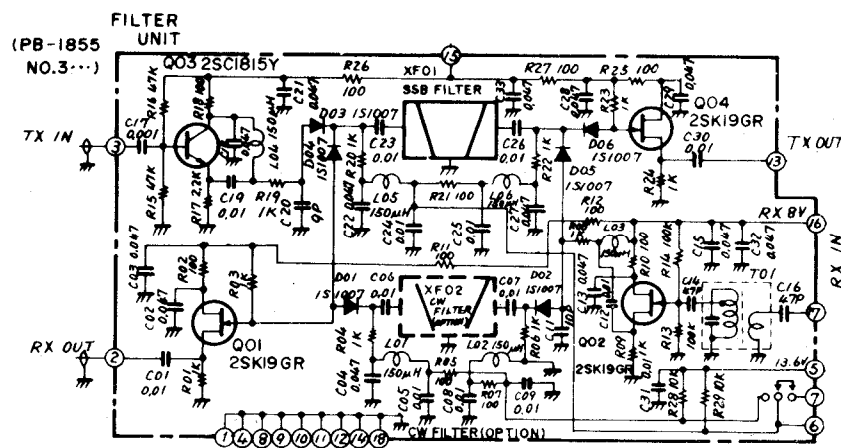
Q₅₁₃ and Q₅₁₄ (2SC1815Y) and detected by D₅₀₅ and D₅₀₆ (1S188FM), producing a DC voltage. This voltage turns squelch controller Q₅₁₂ (2SC1815Y) on; with Q₅₁₂ on, the base of Q₅₁₅ is grounded, quieting the audio amplifier. When a carrier is present, the quieting action of the receiver removes noise from the discriminator output, and Q₅₁₂ is turned off, permitting normal operation of Q₅₁₅.

As the drain voltage increases, Q₁₀₅ will turn on, and the collector voltage will decrease. Accordingly, gate 2 of Q₁₀₄ will be biased to block the signal flow momentarily in the presence of the noise pulse.

Q₁₇₀₆ (2SC1815Y) samples the output of Q₁₇₀₅, providing AGC control action on Q₁₇₀₄ and Q₁₇₀₅.

FILTER UNIT (PB-1855)

SSB and CW signals from pin 7 of the RF UNIT appear at pin 17 of the FILTER UNIT. The 10.81 MHz signal is amplified by buffer amplifier Q₃₀₁ (2SK19GR) and passed through SSB filter XF₃₀₁ or optional CW filter XF₃₀₂. The filtered IF signal is amplified again by buffer amplifier Q₃₀₂ (2SK19GR) and passed to the SSB IF UNIT.



SSB IF UNIT (PB-1854)

The 10.81 MHz filtered IF signal from pin 2 is amplified by Q₂₀₁, Q₂₀₂, and Q₂₀₃ (3SK59Y) and delivered to SSB detector Q₂₀₄ (μPC1037H), where the signal is joined with the BFO signal from the MIC AMP UNIT. The resulting audio signal exits the circuit board at pin 15, passes through the mode switch, and reappears at pin 6, where it is fed to amplifier Q₂₀₉ (2SC1000GR). The audio response is then shaped by Q₂₁₀ (2SC1815Y), which acts as an active low-pass filter; the signal is then delivered to the AF UNIT.

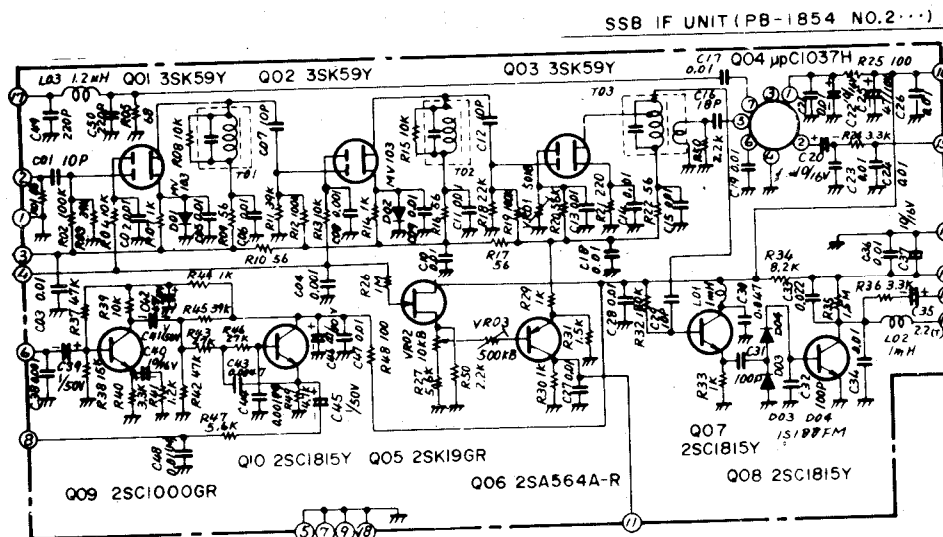
A portion of the output of Q₂₀₃ is detected by D₂₀₂ and D₂₀₃ (1S188FM), amplified by buffer amplifier Q₂₀₇ (2SC1815Y) and delivered to AGC amplifier Q₂₀₈ (2SC1815Y), which controls the gain of the IF and RF amplifiers. A further sampling of the signal is made at the output of Q₂₀₈; this signal is amplified by buffer Q₂₀₅ (2SK19GR) and DC amplifier Q₂₀₆ (2SA564AR), and this DC voltage produces an indication of received signal strength on the S-meter.

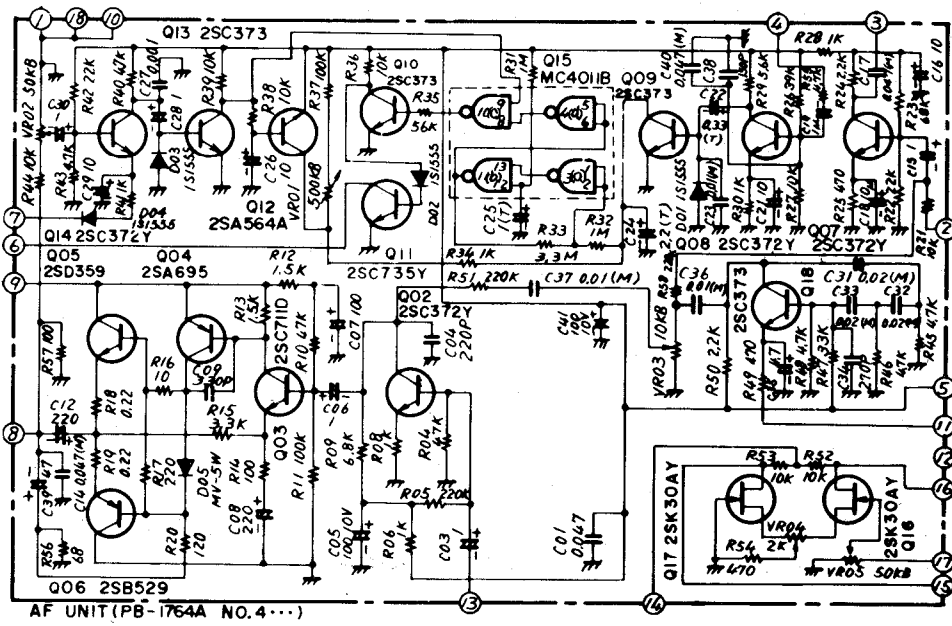
AF UNIT (PB-1764)

The audio signals are passed via the mode switch to pin 13 of the AF UNIT, with SSB and CW signals passing through Q₂₀₉ and Q₂₁₀. The signal is amplified by Q₄₀₂ (2SC372Y), Q₄₀₃ (2SC711D), Q₄₀₄ (2SA695), Q₄₀₅ (2SD359), and Q₄₀₆ (2SB529), delivering 3 watts of audio output to the speaker through an OTL (output transformerless) circuit configuration.

The output of sidetone oscillator Q₄₁₈ (2SC373) is fed to Q₄₀₂.

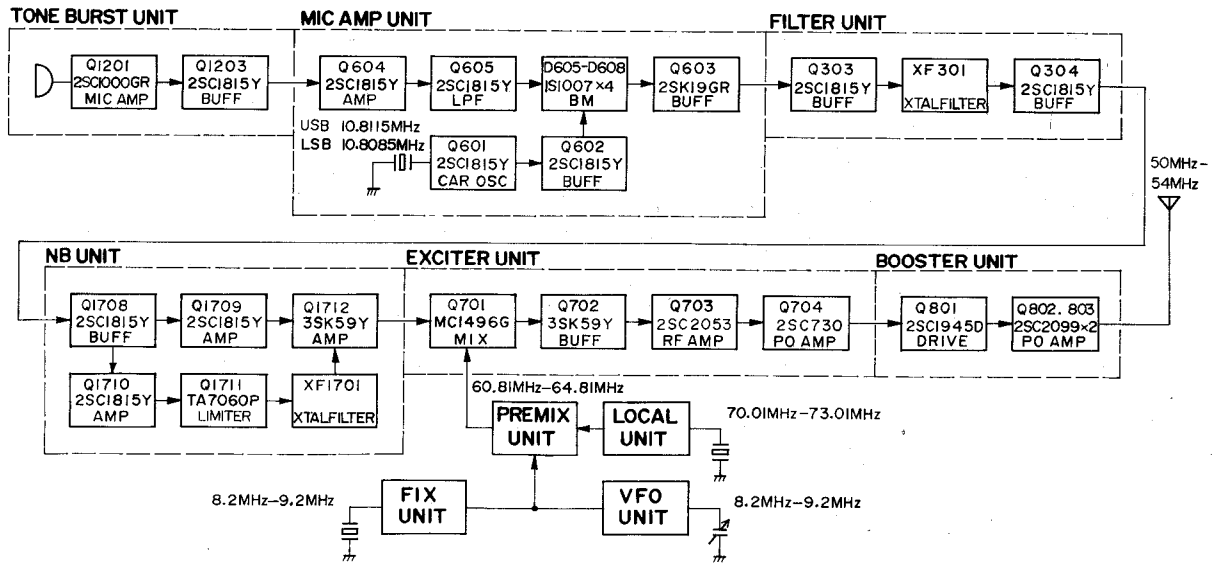
In the FM mode, a DC voltage at the discriminator is applied to differential amplifier Q₄₁₆ and Q₄₁₇ (2SK30AY). When the frequency of the received signal is shifted from the discriminator center, the resulting DC voltage causes either Q₄₁₆ or Q₄₁₇ to conduct, and the amount of shift is displayed on the meter when the meter switch is in the DISC position.





TRANSMITTER

The discussion of the transmitter section of the FT-625RD will be done on a mode-by-mode basis.



SSB TX SIGNAL PATH

SSB

MIC AMP UNIT (PB-1857)

The speech signal from the microphone enters the TONE BURST UNIT at pin 6B, and is amplified by Q₁₂₀₁ (2SC1000GR) and buffer amplifier Q₁₂₀₃ (2SC1815Y) and fed to pin 3B of the MIC AMP UNIT.

The signal is controlled in amplitude by MIC GAIN control VR_{3a}. The signal is amplified further by Q₆₀₄ (2SC1815Y) and shaped by low-pass filter Q₆₀₅ (2SC1815Y) for delivery to the ring modulator, D₁₀₂₅–D₁₂₀₈ (1S1007).

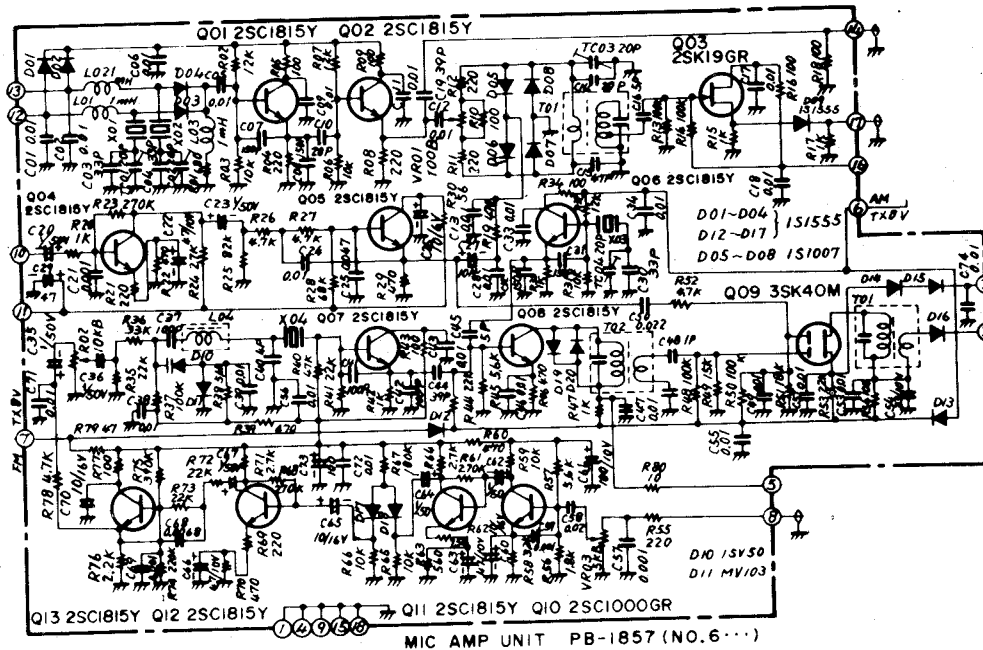
Carrier oscillator Q₆₀₁ (2SC1815Y) oscillates at 10.8115 MHz for LSB and 10.8085 MHz for USB, depending on the position of the mode switch. The output from the oscillator is fed through buffer amplifier Q₆₀₂ (2SC1815Y) to the ring modulator. The resulting 10.81 MHz double side-band signal is amplified by buffer amplifier Q₆₀₃ (2SK19GR) and fed to the FILTER UNIT through pin 17.

FILTER UNIT (PB-1855)

The 10.81 MHz DSB signal is fed from pin 3 to buffer amplifier Q₃₀₃ (2SC1815Y). From here the signal passes through diode switch D₃₀₃ (1S1007), is filtered by XF₃₀₁, and the resulting SSB signal passes through diode switch D₃₀₆ (1S1007) to buffer amplifier Q₃₀₄ (2SK19GR). The amplified SSB signal is fed from pin 13 to the NB UNIT.

NB UNIT (PB-1866)

The SSB signal is fed from pin 17 to buffer amplifier Q₁₀₇₈ (2SC1815Y), and from there the signal is applied to the bases of Q₁₇₀₉ and Q₁₇₁₀ (2SC1815Y). When the RF processor switch is OFF, the SSB signal is amplified by Q₁₇₀₉ and fed to Q₁₇₁₂ (3SK59Y). When the processor switch is ON, the SSB signal is amplified by Q₁₇₁₀ and further amplified by limiter Q₁₇₁₁ (TA7060P), where the signals that exceed the preset clipping level are sliced out. This highly clipped SSB signal is passed through a selective filter, XF₁₇₀₁, to remove RF harmonics that result from clipping. The filtered output signal is amplified by Q₁₇₁₂ and fed to the EXCITER UNIT.



EXCITER UNIT (PB-1858)

The SSB signal from pin 2 is fed to the balanced mixer, Q₇₀₁ (MC1496G), where the SSB signal is heterodyned to the desired RF frequency by mixing with the 60.81–64.81 MHz local signal supplied from the PRE MIX UNIT. The output signal from the balanced mixer passes through tuned circuits consisting of T₇₀₁–T₇₀₅, which are tuned by varactor diodes D₇₀₂–D₇₀₅ and D₇₀₇ (1S2209), in which voltages are preset according to the position of the bandswitch. In this manner, the circuit is tuned exactly to the operating frequency, and spurious radiation is effectively eliminated.

The signal is then amplified by Q₇₀₂ (3SK59Y), Q₇₀₃ (2SC2053), and Q₇₀₄ (2SC730), providing 0.2 watts of drive to the BOOSTER UNIT.

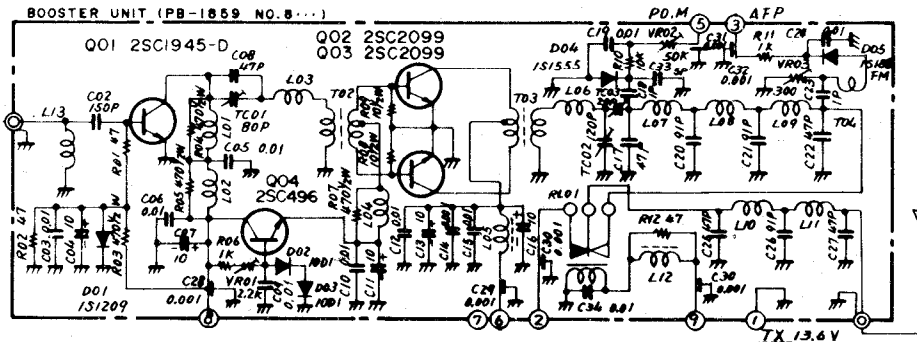
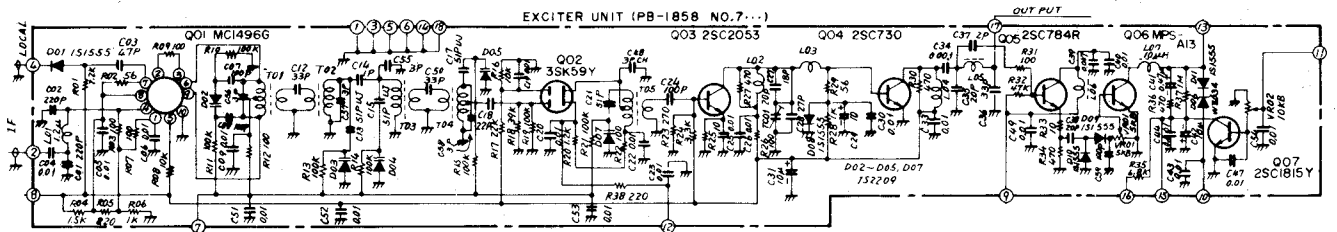
BOOSTER UNIT (PB-1859)

The signal from the EXCITER UNIT is fed to the BOOSTER unit's driver amplifier Q₈₀₁ (2SC1945D) and to power amplifiers Q₈₀₂ and Q₈₀₃ (2SC2099), providing 25 watts of RF output. The signal is fed through a low-pass filter to the antenna jack.

A small portion of the output is rectified by D₈₀₄, and the resulting DC voltage is fed to the meter, where an indication of relative output power is provided.

A further sampling of the RF output is made by D₈₀₅ (1S188FM), and the resulting DC voltage is amplified by Q₇₀₇ (2SC1815Y) and applied to ALC amplifier Q₇₀₆, which controls the gain of Q₇₀₂. In the presence of high SWR, the drive level through the EXCITER UNIT is reduced, thus protecting the final transistors.

The bias to Q₈₀₂ and Q₈₀₃ is stabilized by Q₈₀₄ (2SC496O) at 9 volts, and it is controlled by diodes D₈₀₂ and D₈₀₃ (10D1), providing further protection for the final transistors.



AM

The AM signal path is identical to that for SSB until the signal reaches Q₆₀₅. At this point, the signal is delivered to AM modulator Q₆₀₉ (3SK40M). The AM carrier is generated at 10.8107 MHz by oscillator Q₆₀₆ (2SC1815Y), amplified by buffer Q₆₀₈ (2SC1815Y), and fed to Q₆₀₉. The output of Q₆₀₉ is delivered to pin 2 of the EXCITER UNIT, and from there to amplifier Q₁₇₁₂. The signal then is amplified in the same way as the SSB signal, for delivery to the antenna.

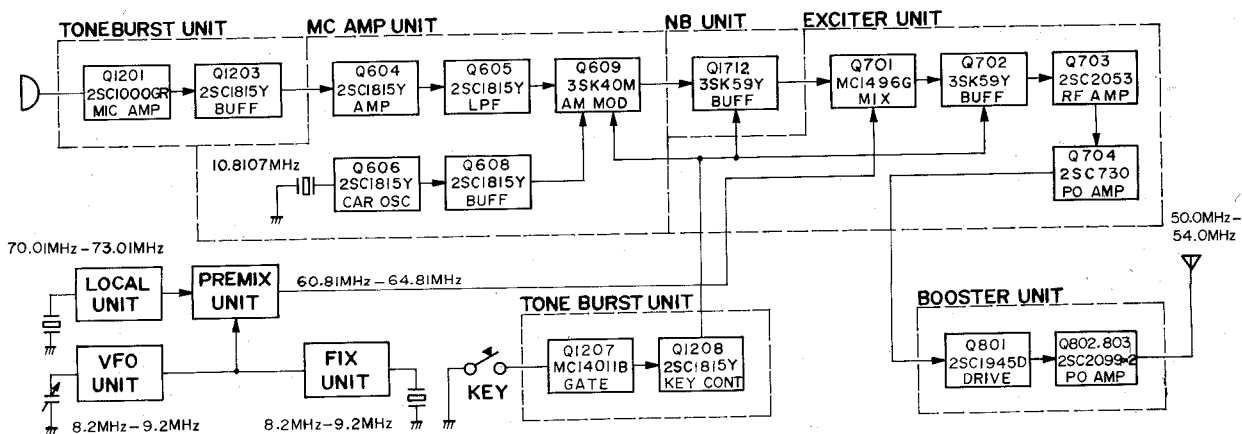
CW

In the CW mode, the carrier generated for AM by Q₆₀₆ is used. The key line is connected to sidetone oscillator Q₄₁₈, the output of which is fed to Q₄₀₂ for sidetone monitoring, as well as to VOX amplifier Q₄₀₇ (2SC372Y) for semi-break-in operation.

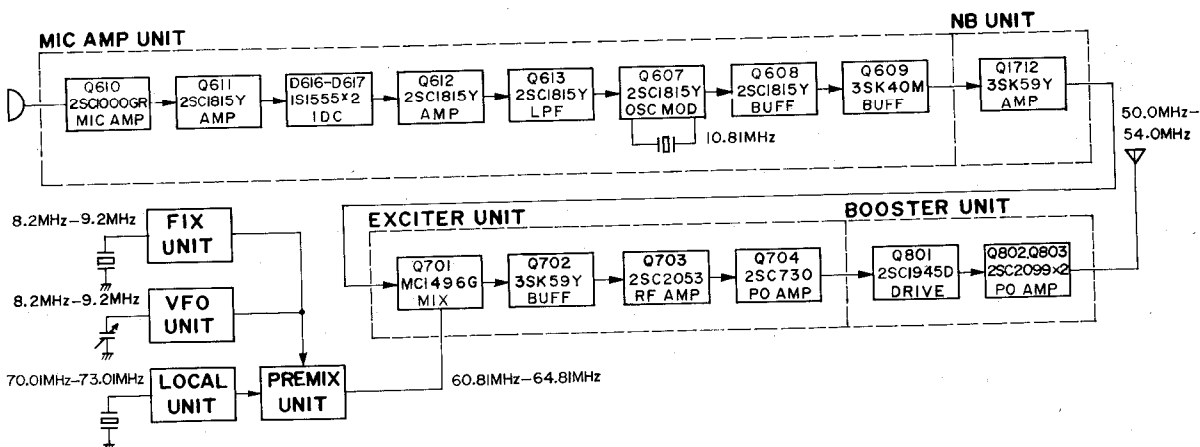
The key line is also fed to a flip-flop circuit in Q₁₂₀₇ (MC14011B), which provides the high-low output to drive keying switch Q₁₂₀₈ (2SC1815Y). Q₁₂₀₈ keys both Q₆₀₉ and Q₇₀₂, providing a stable, chirp-free CW signal. Shaping is applied to the output of Q₁₂₀₈ to remove any trace of key clicks.

FM

The speech signal for FM is amplified by microphone amplifier Q₆₁₀ (2SC1000GR), and is further amplified by Q₆₁₁ (2SC1815Y). The amplified signal is fed to the instantaneous deviation control (IDC), consisting of diodes D₆₁₆ and D₆₁₇ (1S1555), which clips both positive and negative peaks.



CW, AM TX SIGNAL PATH



FM TX SIGNAL PATH

The output from the IDC is amplified by Q₆₁₂ (2SC1815Y), and fed through active low-pass filter Q₆₁₃ (2SC1815Y), which removes harmonics above the speech range caused by clipping. The speech signal is then applied to phase modulator varactor diode D₆₁₀ (1S2209), which varies the frequency of the 10.81 MHz modulator oscillator, Q₆₀₇ (2SC1815Y). The frequency modulated signal is amplified by buffer amplifiers Q₆₀₈ (2SC1815Y) and Q₆₀₉ (3SK40M), passed to the NB UNIT, where it is amplified by Q₁₇₁₂, and then fed to Q₇₀₁ for conversion to 50–54 MHz by mixing with the 60.81–64.81 MHz local signal. From there, the signal is amplified as on the other modes.

COMMON CIRCUITS

CARRIER GENERATION

Q₆₀₁, located on the MIC AMP UNIT, generates an LSB carrier of 10.8085 MHz and a USB carrier of 10.8115 MHz. The AM and CW carrier is generated at 10.8107 MHz by Q₆₀₆.

VFO UNIT (PB-1774)

A modified Colpitts oscillator is used to generate a 1 MHz tuning range for the VFO of 8.2–9.2 MHz. The oscillator signal generated by Q₁₃₀₁ (2SC372Y) is varied by VC₁₃₀₁, which is geared to a precision dial tuning mechanism. Temperature compensation is provided for by sub-blades of VC₁₃₀₁.

The output from the VFO oscillator is amplified by buffer amplifiers Q₁₃₀₂ (2SK19GR) and Q₁₃₀₃ (2SC372Y) and delivered to the FIX UNIT.

FIX UNIT (PB-1750-3380)

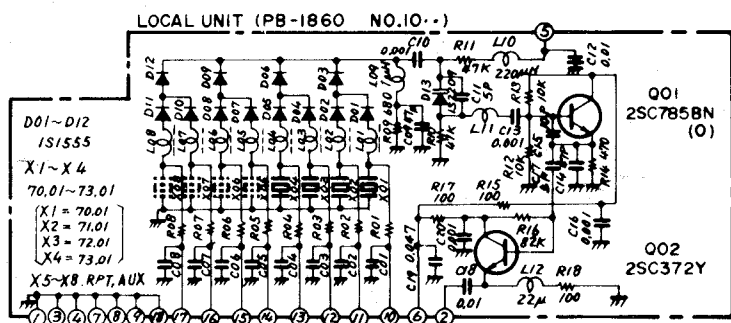
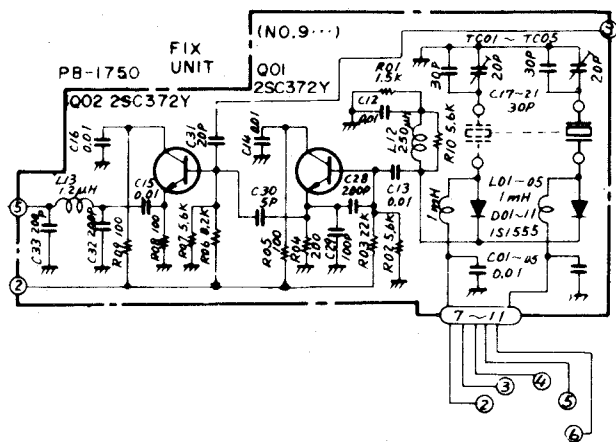
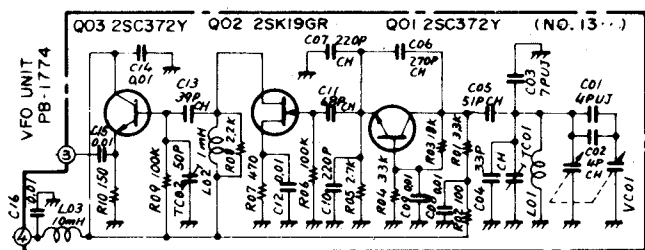
In addition to VFO operation, 5 crystal controlled channels may be employed for fixed frequency operation. Selection of the crystal channel or VFO operation is made by the selector switch on the front panel.

The FIX channel crystal oscillator Q₉₀₁ (2SC372Y) oscillates at a frequency between 8.2 and 9.2 MHz. The output is fed through buffer amplifier Q₉₀₂ (2SC372Y) to the PREMIX UNIT. Trimmer capacitors TC₉₀₁–TC₉₀₅ provide for precise adjustment of the crystal frequency.

The VFO signal also passes through buffer Q₉₀₂ and is passed to the PREMIX UNIT.

LOCAL UNIT (PB-1840)

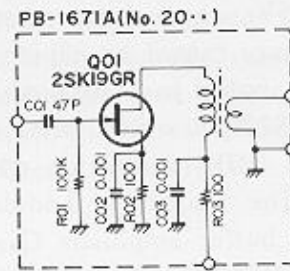
A premix local signal of 70.01–73.01 MHz is generated by Q₁₀₀₁ (2SC785BN) and amplified by buffer amplifier Q₁₀₀₂ (2SC372Y). This signal is delivered to the PREMIX UNIT for mixing with the VFO signal. The frequency mixing scheme is shown in Figure 4.



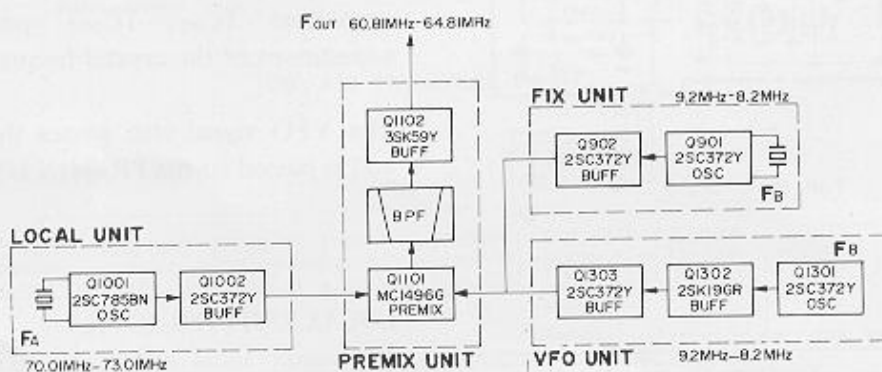
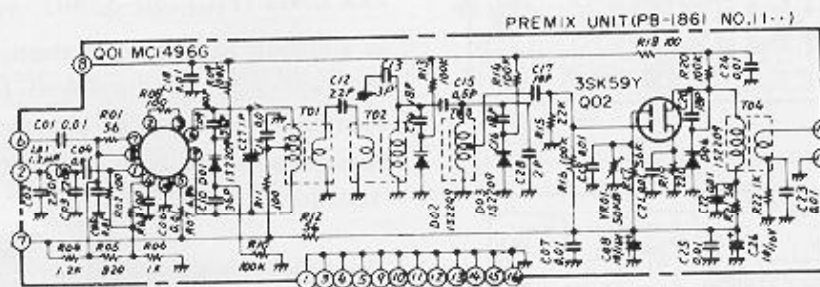
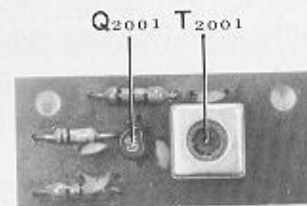
PREMIX UNIT (PB-1861)

The premix system utilizes double balanced mixer Q_{1101} (MC1496G). Here the premix local signal at 70.01–73.01 MHz is mixed with the VFO signal at 8.2–9.2 MHz, yielding an output local signal of 60.81–64.81. This frequency range, when mixed with the incoming RF signal, yields the first IF of 10.81 MHz.

The output from Q_{1101} is passed through a band-pass filter consisting of T_{1101} , T_{1103} , and varactor diodes D_{1101} – D_{1103} (1S2209). The filtered signal is amplified by buffer Q_{1102} (3SK59Y) and delivered to the COUNTER BUFFER UNIT, RF UNIT, and the EXCITER UNIT.



COUNTER BUFFER UNIT



BAND (MHz)	F _A (MHz)	F _B (MHz)	F _{out} (MHz)
50.0-51.0	70.01	9.2-8.2	60.81-61.81
51.0-52.0	71.01		61.81-62.81
52.0-53.0	72.01		62.81-63.81
53.0-54.0	73.01		63.81-64.81

Fig. 4

FREQUENCY MIXING CHART

COUNTER UNIT (PB-1867)

The frequency of operation is indicated in MHz, kHz, and to 100 Hz resolution by six large light-emitting diode display digits.

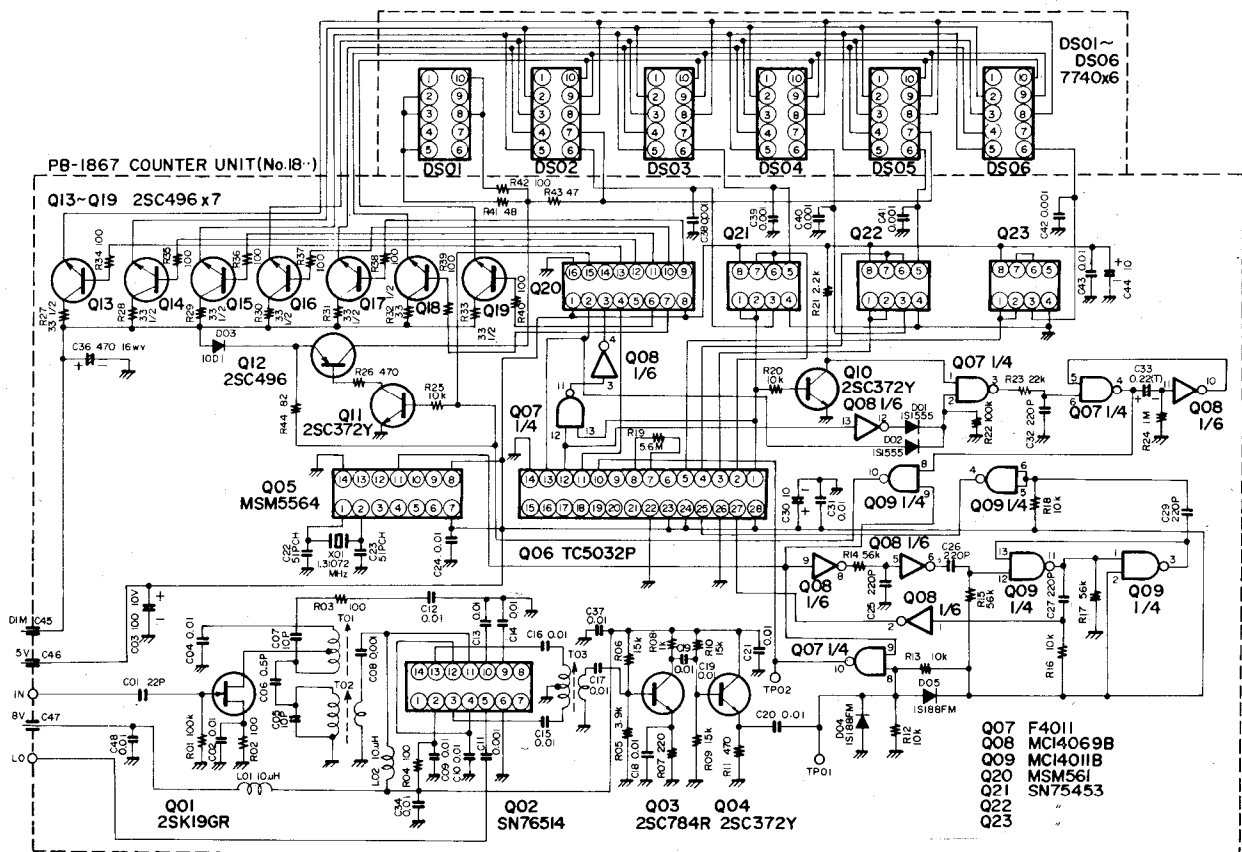
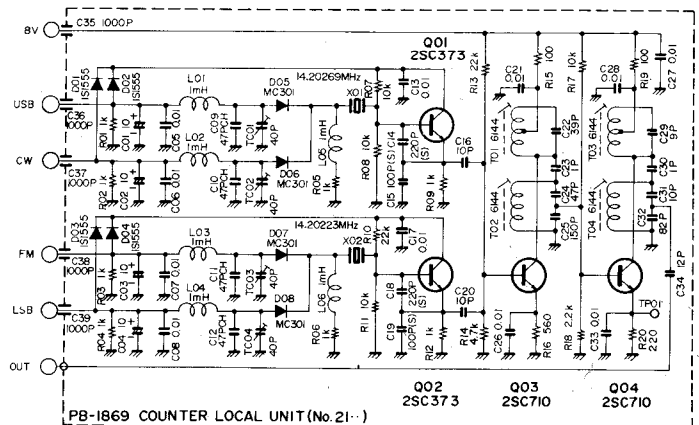
The signal from the PREMIX UNIT is amplified by Q1801 (2SK19GR) and fed to double balanced mixer Q1802 (SN76514). Here the 60.81–64.81 MHz premix signal is mixed with a local signal from the OSC UNIT of 56.81 MHz, producing a 4–8 MHz signal at its output.

The 4–8 MHz signal is amplified by Q1803 (2SC784R), and fed through a wave shaper, Q1804 (2SC372Y), to counter gate Q1807 (F4011), which counts the pulses which pass while the gate is open. The pulses are fed to the six digit decade counter, Q1806 (TC5032P), which counts 100 Hz, 1 kHz, 10 kHz, 100 kHz, and 1 MHz. The BCD output signal from Q1806 is fed through LED dimmer Q1802 (MSM561) and Q1813–Q1819 (2SC496) to the display LED's, DS01–DS06 (HP5082–7740). Q1821–Q1823 (SN75453) act as a series of switches operated by a timing signal delivered from Q1806 to select the output of Q1806 which drives the display in the sequence 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz.

When the transceiver is tuned below 50.000 MHz or above 53.999 MHz, Q1811 (2SC372Y) and Q1812 (2SC496) generate a blanking signal to the LED drivers.

OSC (COUNTER LOCAL) UNIT (PB-1869)

This unit is used to generate a 56.81 MHz heterodyne signal for oscillates at 14.20269 MHz for USB/CW, and 14.20223 MHz for AM, FM, and LSB. Its output is multiplied by 4 by doublers Q2103 and Q2104 (2SC710), producing the 56.81 MHz signal. A diode switch in series with crystal X1801 provides frequency compensation when the mode is changed.



POWER SUPPLY and REGULATOR UNIT (PB-1858)

The power supply has been designed for operation from 100/110/117/200/220/234 volts AC, 50/60 Hz, or 12 volts DC, negative ground. Inserting the appropriate power cord into the rear panel receptacle makes the connections necessary for operation from the AC or DC supply.

For AC operation, the DC voltage is supplied from bridge rectifier unit D₂ (S15VB10), which is connected to a 20 volt, 6 amp secondary winding of the power transformer. The DC voltage is stabilized at 13.8 volts by the voltage regulator circuit consisting of Q₁₄₀₁ (2SD313), Q₁₄₀₂ (2SC372Y), Q₁ (MJ802) and D₁₄₀₂ (WZ-090).

Since such circuits as the VFO, FIX, and LOCAL units require an extremely stable voltage, the 13.6 V DC supply is further stabilized at 8 volts by Q₁₄₀₄ (μ PC14308).

Q₁₄₀₃ acts as a switch to disable the voltage regulators when the current exceeds a preset value.

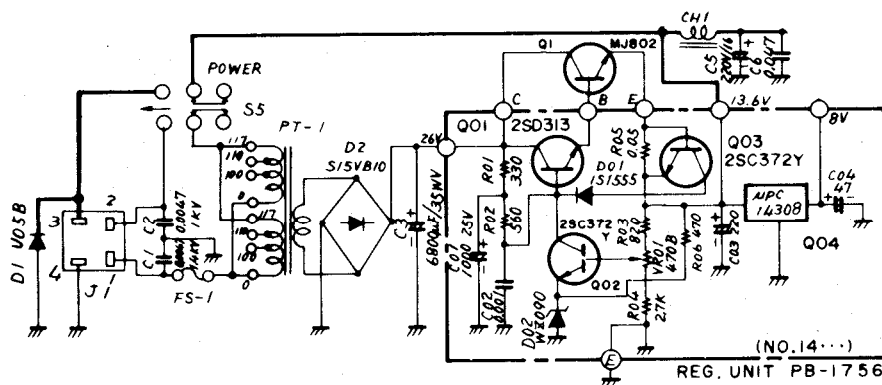
For DC operation, the positive voltage is connected to pin 3 and the negative voltage to pin 4 of the power receptacle. To protect the circuits from reversed polarity of the DC voltage, D₁ (U05B) conducts heavily under reversed polarity conditions to blow the line fuse in the DC cord.

VOX OPERATION

A portion of the speech input from the microphone is amplified by Q₄₀₇ (2SC372Y) on the AF UNIT, passed through VOX GAIN control VR_{4a}, further amplified by Q₄₀₈ (2SC372Y), and applied to the base of Q₄₀₉ (2SC373). Q₄₀₉ conducts with the speech signal, causing the collector to reach the "low" state. When a speech signal is not present, Q₄₀₉ cuts off, and the voltage across C₄₂₄ becomes "high".

C₄₂₄, VR₄₀₁, R₄₃₄, and R₄₃₇ form the delay circuit to adjust the VOX relay hold time. The collector voltage is applied to NAND gate Q₄₁₅ (MC14011B), causing pin 8 to become "high". When pins 8 and 9 are "high", pin 10 becomes "low", causing Q₄₁₀ (2SC373) to cut off. In turn, relay controller Q₄₁₁ (2SC735) actuates the VOX relay.

The antitrip circuit provides a bucking voltage to prevent the speaker output from tripping the transmitter. The receiver audio output is connected through ANTITRIP potentiometer VR₄₀₂ to the antitrip amplifier, Q₄₁₄ (2SC372Y). Amplifier Q₄₁₃ (2SC373) conducts with the rectified voltage provided from D₄₀₃ (1S1555), thus keeping the potential at pin 9 of Q₄₁₅ "low", maintaining Q₄₁₅ in an "off" configuration while receiving.



The collector voltage of Q₄₁₃ is also fed to the base of Q₄₁₂, which conducts with high collector voltage on Q₄₁₃, causing Q₄₁₄ to become "high" rapidly for immediate relay actuation when a speech signal appears in the microphone circuit.

CW SIDETONE

Tone oscillator Q₄₁₈ (2SC373) operates when the MODE switch is in the CW position. It is a phase shift oscillator, operating at approximately 800 Hz.

The tone output is activated by the keying circuit through the emitter circuit of Q₄₁₈. It is coupled through sidetone level control VR₄₀₃ to the receiver audio amplifier Q₄₀₃ for sidetone monitoring. The output from Q₄₁₈ is also coupled to VOX amplifier Q₄₀₈ for semi-break-in operation.

ALC

A small portion of the output from the EXCITER UNIT is rectified by diodes D₇₀₉ and D₇₁₀ (1S1555) and the resulting DC voltage is amplified by Q₇₀₅ (2SC784R) and Q₇₀₆ (MPSA13). The output of Q₇₀₆ is applied to the gate of Q₁₇₁₂ and Q₇₀₂. ALC bias control VR₇₀₁ controls the bias applied to Q₇₀₆, and the gain of Q₁₇₁₂ and Q₇₀₂ can then be controlled to limit the drive applied to the final amplifier, preventing any distortion caused by overdrive.

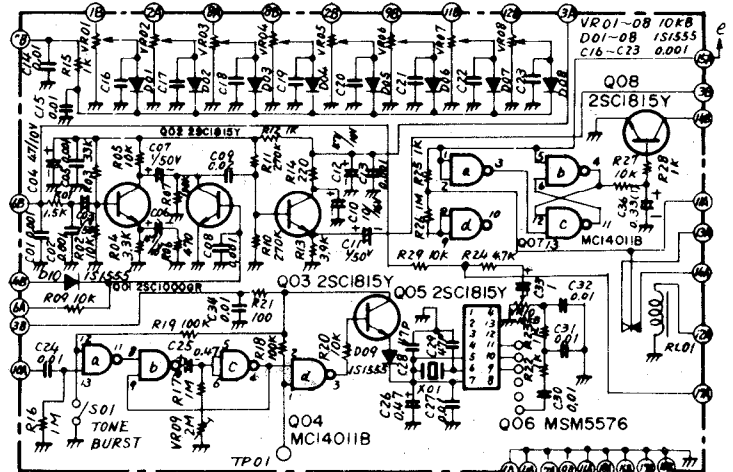
TONE BURST UNIT (PB1862)

When the PTT switch is closed, a DC voltage is applied to trigger Q₁₂₀₄ (MC14011B), a NAND gate which produces a pulse of 0.5–1 second duration. The pulse switches Q₁₂₀₅ (2SC1815Y) to supply DC voltage to Q₁₂₀₆ (MSM5576), where the clock signal is divided by 1024, 2048, or 4096, producing an accurate tone burst signal. This signal is fed to the base of the microphone amplifier Q₆₁₀. The tone length is set by VR₁₂₀₉, and the level is set by VR₁₂₁₀.

AMGC

The AMGC circuit is located on the FM IF UNIT, and is used to reduce the gain of the microphone amplifier when only low-level background noise is present (no speech input from the operator). The microphone signal is fed to pin 17 of the circuit board, is amplified by Q₅₀₁ (TA7063), and is delivered to Q₅₀₂ (2SC1815Y). When a sufficient level of speech input is applied to the microphone,

KEYING BURST UNIT
(PB-1862 NO. 12...)



Q₅₀₂ conducts, causing the output of NAND gate Q₅₀₃ (MC14011B) to be "low". This condition cuts off AMGC controller Q₅₀₄ (2SC1815Y). The collector circuit of Q₅₀₄ is connected to the base of the microphone amplifier, Q₁₂₀₂.

When the microphone input signal strength becomes significantly lower than the normal speech level (background noise only), Q₅₀₂ turns off, causing the output of Q₅₀₃ to be "high". This condition causes Q₅₀₄ to conduct, grounding the output circuit of Q₁₂₀₂.

VR₅₀₂ controls the gate holding time.

MAINTENANCE & ALIGNMENT

GENERAL

Your FT-625RD transceiver has been carefully aligned and tested at the factory prior to shipment. The reliability of the solid-state devices used in the FT-625RD should provide years of trouble-free service if the transceiver is not abused, and if routine maintenance is carried out.

The following precautions should be observed, so as to prevent damage to the transceiver:

- (1) Do not interchange the AC and DC power cords.
- (2) Do not apply any AC voltage other than that voltage determined by the transformer primary winding.
- (3) When replacing fuses, be certain to use a fuse of the proper rating for the voltage being used.
- (4) Do not exceed 14 volts DC, at the POWER receptacle, for DC operation. When operating mobile, the battery voltage should be measured with the battery under load (transmitter "keyed" in the FM mode), with the engine running fast enough so that the ammeter shows a "charge". In addition, do not

operate the FT-625RD if the supply voltage is less than 12 volts DC.

- (5) Avoid direct exposure to sunlight or water.

ROUTINE MAINTENANCE

Routine maintenance should be limited to keeping the transceiver clean, and performing occasional performance checks of the transmitter RF power output and the receiver sensitivity.

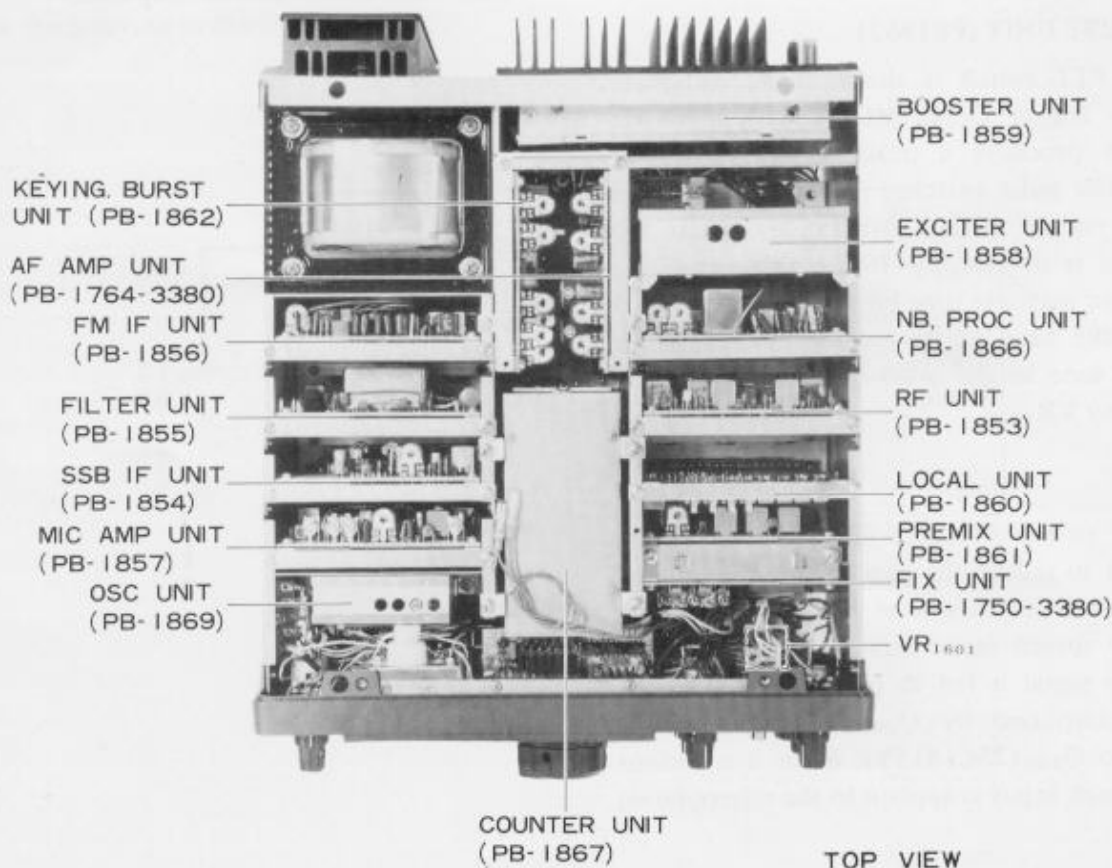
Cleaning:

When the transceiver has been used in a dusty or sandy environment, the interior should be cleaned periodically. A vacuum cleaner or low pressure air blower should be used.

Accumulated dirt may be removed with a soft brush. Check that the interior is thoroughly dry before replacing the cabinet and/or operating the equipment. Wipe the exterior with a damp cloth when necessary.

PERFORMANCE CHECKS

Make all performance checks at 13.6 volts DC (under load), or on the appropriate AC voltage as determined by the transformer primary wiring.



Check the transmitter as follows:

- (a) Connect a suitable 50 ohm dummy load/RF wattmeter to the ANT receptacle.
- (b) Set the MODE switch to the FM position, and key the transmitter while observing the power output, which should be approximately 25 watts. At full power, the S-meter should indicate between 6 and 8 on the relative power output scale.
- (c) Set the MODE switch to SSB, and key the transmitter. Speak in a normal voice into the microphone. The output meter should indicate between 3 and 5 nominally.

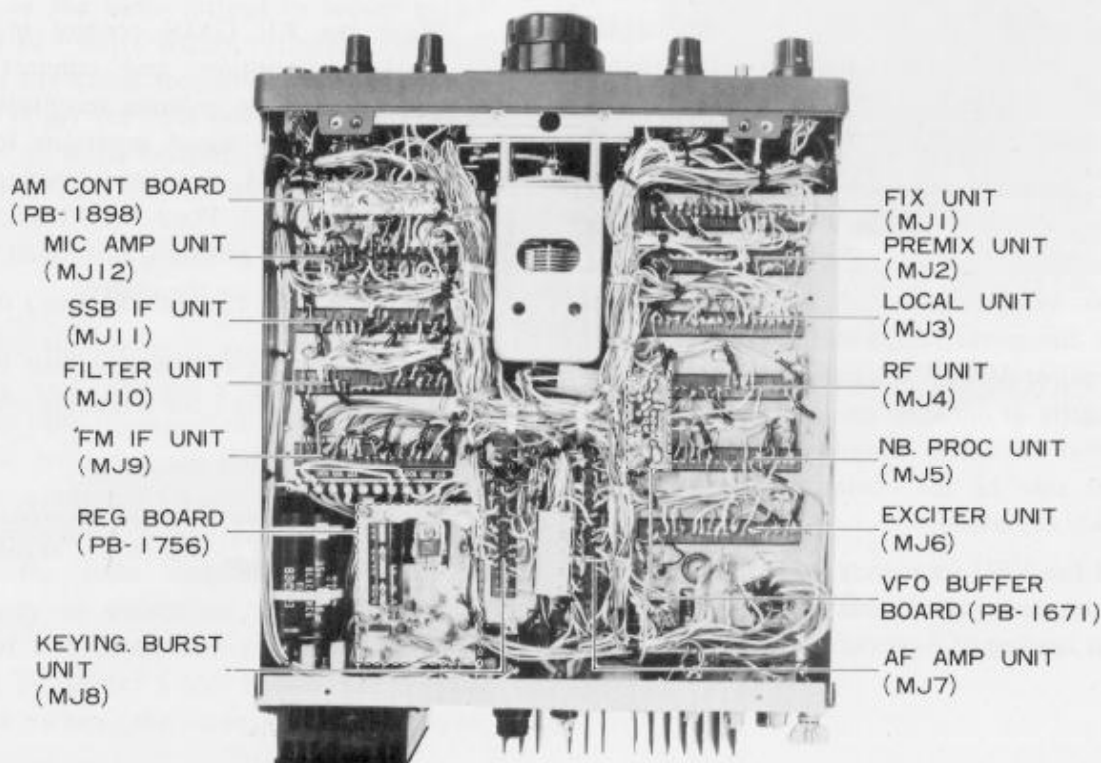
Check the receiver sensitivity as follows:

- (a) Connect an AC VTVM to the SP jack. Set the MODE switch to the FM position, and set the SQUELCH control fully counterclockwise.
- (b) Connect the RF output of a precision VHF signal generator to the ANT receptacle and note the VTVM reading with no signal input. Adjust the AF GAIN control and the VTVM range, as required, to obtain a full scale VTVM reading. Do NOT change the setting of the AF GAIN control after this calibration has been made.
- (c) Set the signal generator to the receiving frequency of the transceiver, and adjust the output amplitude of the signal generator until the

VTVM reads 1/100th (20 dB decrease) of the reading in step (b). The signal generator output voltage at this point is the 20 dB quieting sensitivity, and it should be approximately 0.35 μ V.

- (d) Set the MODE switch to SSB, and connect the AC VTVM to the speaker output. Apply an unmodulated 0.5 μ V signal from the signal generator, and tune the transceiver tuning dial for a maximum VTVM reading.
- (e) Advance the RF Gain control to the fully clockwise position, and adjust the AF GAIN control for a reading of 450 mV on the VTVM.
- (f) Reduce the signal generator output, and read the VTVM; the VTVM reading should be less than 45 mV for a 10 dB S/N ratio.

If the above checks indicate a need for realignment, it is recommended that the unit be returned to the dealer for this procedure. Alignment requires special test equipment not normally available to the average station owner. Adjustment of the tuned circuits without the proper equipment or technical expertise will result in degraded transceiver performance.



BOTTOM VIEW

ALIGNMENT

SOME OF THE FOLLOWING PROCEDURES REQUIRE SPECIAL TEST EQUIPMENT AND TECHNICAL KNOWLEDGE, AND SHOULD BE PERFORMED ONLY BY AN EXPERIENCED TECHNICIAN.

AF UNIT (PB-1764A-3380)

(1) CW Semi-break-in

Adjust VR₄₀₁, the DELAY control, for the desired relay hold time.

(2) CW Sidetone Level

Adjust VR₄₀₃ for the desired sidetone level.

(3) Antitrip

Set the ANTITRIP control, VR₄₀₂, to the minimum point that will prevent the speaker output from activating the VOX.

(4) Discriminator Center Meter

Set the controls as follows:

CHANNEL VFO

MODE FM

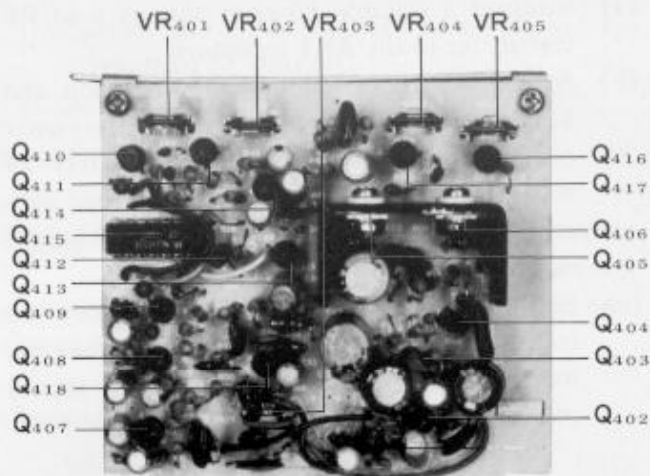
DISC OFF (S-meter position)

RF GAIN Fully clockwise

MARKER ON (Analog model; for 625RD, connect signal generator to antenna receptacle)

Tune the transceiver for a maximum S-meter reading on the marker or signal generator signal. Tune the main dial so as to find the center of the maximum signal indication. Place the meter switch in the DISC position, and adjust VR₄₀₄ so that the meter pointer is exactly at midscale on the meter. Check to see that the meter moves an equal amount on either side of the center for an equal frequency excursion.

Shift the VFO frequency 10 kHz higher than the reference signal, and adjust VR₄₀₅ for a meter reading of 8 on the PO scale.



AF UNIT (PB-1764-3380)

SSB IF UNIT (PB-1854)

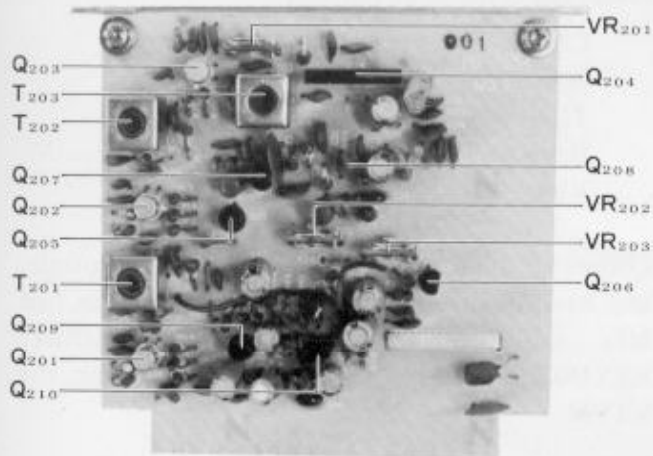
(1) S-Meter Setting

Disconnect the antenna from the coax receptacle. Set the MODE switch to AM, and set the RF GAIN control to the fully counter-clockwise position. Adjust VR₂₀₂ (FULL SCALE) until the meter reads full scale.

Place the RF GAIN control in the fully clockwise position, and connect a signal generator to the antenna receptacle. Set the output of the signal generator to +3dB at 52 MHz, and tune the receiver to the generator signal. Place the TUNE control in the 12 o'clock position, and adjust VR₂₀₁ for a reading of S1 on the meter.

Set the output of the generator to +20 dB, and adjust VR₂₀₃ for a reading of S9 on the meter.

These adjustments should be repeated several times, in order to secure proper calibration of the S-meter.



SSB IF UNIT (PB-1854)

MIC AMP UNIT (PB-1857)

(1) SSB Carrier Frequency

Connect a 50 ohm dummy load, such as the Yaesu YP-150, to the antenna receptacle, and connect the output of an audio oscillator to the microphone input. Set the MODE switch to an SSB mode. Apply a 1500 Hz tone to the microphone input, and adjust the SSB MIC GAIN or the audio output to secure an RF output of 5 watts. Without changing the level, change the audio frequency to 300 Hz, and adjust TC₆₀₁ for LSB and TC₆₀₂ for USB to obtain 2 watts output. Change the audio frequency to 2700 Hz, the output should be 2 watts.

(2) AM/CW Carrier Frequency

Tune the transceiver in the USB mode into a dummy load, and use a separate receiver to monitor the transmitted signal. Tune the external receiver until the transmitted voice quality is natural. Change the FT-625RD to AM (leave the external receiver in USB), and rotate the main dial 800 Hz higher in frequency as shown on the digital display (4/5 of 1 kHz division on analog display). Adjust TC₆₀₄ for a zero beat in the monitor receiver when the transmitter is keyed.

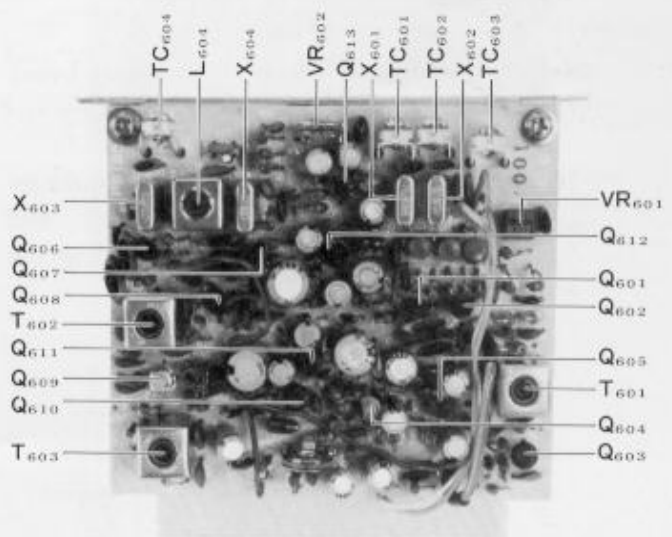
(3) Carrier Balance

Connect a dummy load to the antenna receptacle, and the RF probe of a VTVM to the center conductor of the antenna receptacle. Set the MODE switch to LSB. Set the MIC GAIN control to the fully counter-clockwise position. Set the VOX GAIN control to the MOX position, and adjust VR₆₀₁ and TC₆₀₃ for a minimum reading on the VTVM. A nominal value will be less than 0.2 V.

Repeat this procedure on USB, then repeat again on LSB, so that a minimum reading is obtained on both sidebands.

(4) AM Carrier Level

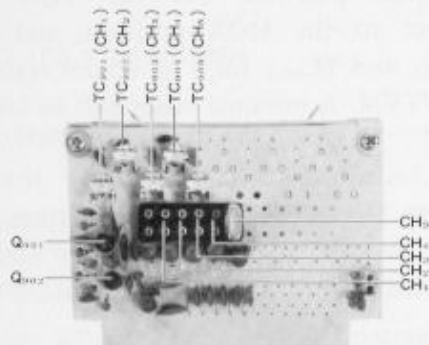
Set the MODE switch to AM, and key the transmitter. With no audio input, adjust VR₂₃₀₁ (AM CONT UNIT) for a reading of 15 watts into a dummy load/wattmeter.



MIC AMP UNIT (PB-1857)

FIX UNIT (PB-1750-3380)

Precise frequency alignment of optional fixed channel crystals may be made by adjustment TC₉₀₁–TC₉₀₅ for channels 1–5, respectively.



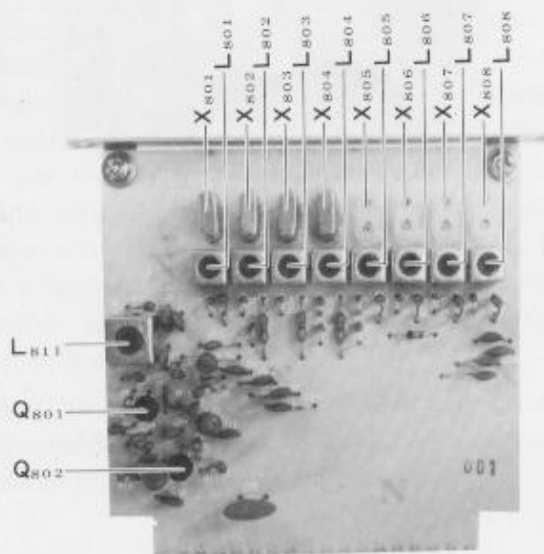
FIX UNIT (PB-1750-3380)

LOCAL UNIT (PB-1860)

Set the BAND switch to 50, and connect precision frequency counter to pin 2 of MJ3. Adjust L₁₀₀₁ for a counter reading of 70.010 MHz.

Set the band switch to 51, and adjust L₁₀₀₂ for a counter reading of 71.010 MHz.

In like fashion, L₁₀₀₃ and L₁₀₀₄ should be adjusted for readings of 72.010 and 73.010 MHz, with the BAND switch in the 52 and 53 positions, respectively.



LOCAL UNIT (PB-1860)

PREMIX UNIT

Preset the controls as follows:

- CHANNEL VFO
- MAIN DIAL 500
- TUNE 12 o'clock position
- BAND 50
- RPT OFF

Connect a dummy load to the antenna receptacle, and connect the DC probe of a VTVM to pin 7 of MJ₆. Adjust VR₁₂₀₁, located on the BURST/KEYING UNIT, for a reading of 3.2 V on the VTVM.

Adjust the following controls for the readings shown below, for the specified bandswitch positions:

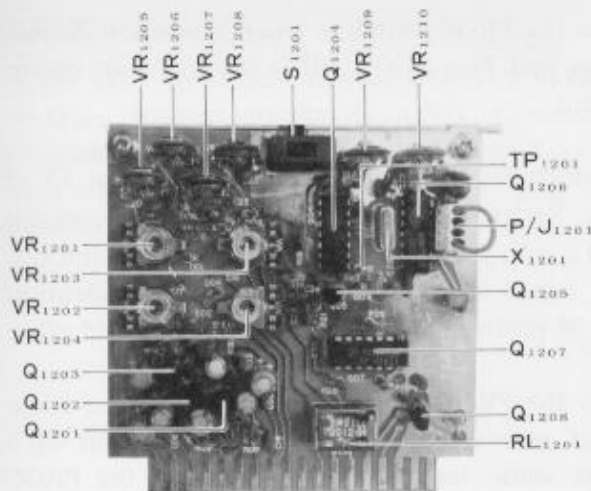
BAND	CONTROL	VTVM READING
51	VR ₁₂₀₂	4.2 V
52	VR ₁₂₀₃	5.2 V
53	VR ₁₂₀₄	6.2 V

Set the BAND switch to 52.

Now connect the RF probe of the VTVM to pin 4 of MJ₆. Peak T₁₁₀₁–T₁₁₀₄, and reset VR₁₁₀₁ for a reading of 200 mV. This process should be repeated several times so that the peaking of the transformers corresponds to a 200 mV reading.



PREMIX UNIT (PB-1861)



BURST KEYING UNIT (PB-1862)

Set the VFO knob to 0. Peak the front panel TUNE control for a maximum reading on the VTVM. Note the position of the TUNE control: this position will be used in future alignment steps, and will be referred to as "52 MHz position". This position should be very close to the 12 o'clock position.

Set the VFO to 500. Set the TUNE control to the 12 o'clock position. Set the BAND switch to 50, and peak VR₁₂₀₁ for a maximum reading on the VTVM. Place the BAND switch to 51, and peak VR₁₂₀₂ for a maximum VTVM reading. Set the BAND switch to 53, and peak VR₁₂₀₄ for a maximum VTVM reading.

Do not adjust VR₁₂₀₃ with the BAND switch in the 52 position, because it has already been adjusted.

For peaking of optional auxiliary repeater split crystals, peak VR₁₂₀₅–VR₁₂₀₈ for 50–54 MHz, respectively, for a maximum VTVM indication. The RPT switch should be at NOR, and the AUX position should be selected.

EXCITER, BOOSTER UNITS (PB-1858, 1859)

For peaking of the driver and final amplifier stages, preset the controls as follows:

BAND	52
MODE	FM
VFO	0
TUNE	52 MHz position

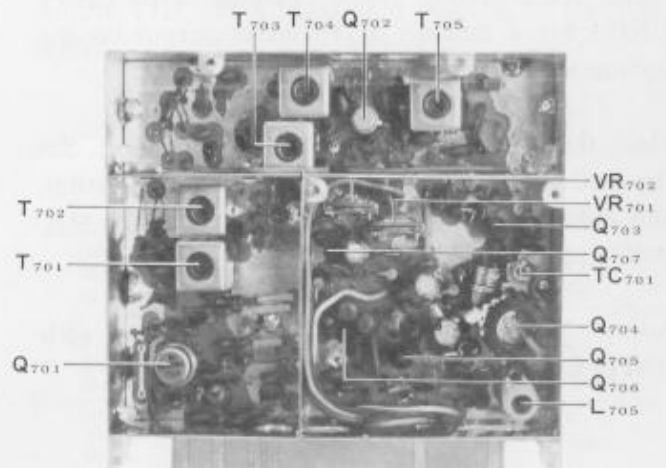
Connect a dummy load/wattmeter to the antenna receptacle.

Connect the RF probe of a VTVM to pin 6 of MJ₅. Peak T₁₇₀₇ for a maximum VTVM reading while transmitting.

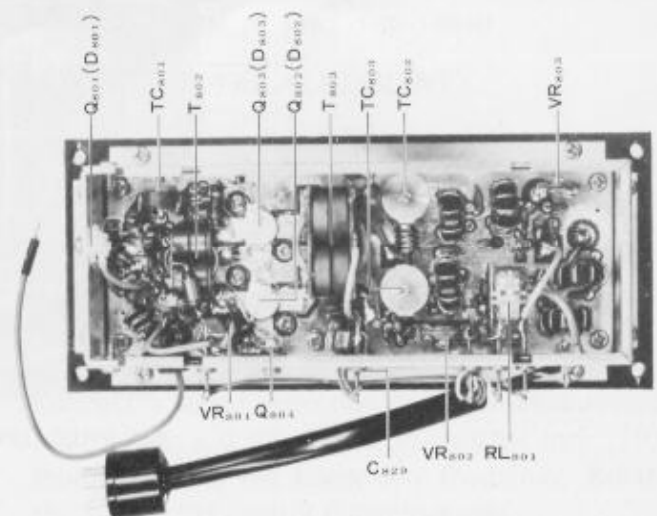
Connect the RF probe of the VTVM to pin 17 of MJ₆. Peak T₇₀₁–T₇₀₅, TC₇₀₁, and L₇₀₅ for a maximum reading on the VTVM.

Connect a DC ammeter between the 13.6 V DC line and feedthrough capacitor C₈₂₉ to which the DC line is connected. Set the front panel PWR CONTROL fully counterclockwise, and adjust VR₈₀₁, located on the BOOSTER UNIT, for a reading of 150 mA while transmitting.

Rotate the PWR CONTROL fully clockwise. Rotate VR₇₀₁ and VR₇₀₂ (EXCITER UNIT) fully clockwise. Adjust TC₈₀₁–TC₈₀₃ (BOOSTER UNIT) for maximum power output as indicated on the wattmeter.



EXCITER UNIT (PB-1858)



BOOSTER UNIT (PB-1859)

ALC, PO METER, and AFP

Connect a DC voltmeter to pin 11 of MJ₆. Adjust VR₈₀₃ for a minimum voltage reading while transmitting.

While transmitting, adjust VR₇₀₁ (EXCITER UNIT) for a reading of 25 watts on the wattmeter.

While transmitting at full power, adjust VR₈₀₂ for a reading of 8 on the front panel PO meter.

Remove the dummy load from the antenna receptacle. Transmit at full power, and adjust VR₇₀₂ for a reading of 2 on the PO meter.

Connect the dummy load/wattmeter to the antenna receptacle, and place the MODE switch in the AM position. Place the AM carrier control in the 3 o'clock position.

While transmitting, adjust VR₂₃₀₁ (AM CONT UNIT) for a reading of 15 watts output on the wattmeter.

Place the MODE switch in the SSB position. Set the MIC GAIN control to the 12 o'clock position, and connect an audio signal generator to the MIC jack. Apply a 1 kHz, 1.5 mV audio signal.

Adjust T₆₀₁ (MIC AMP UNIT) and T₁₇₀₄ (NB UNIT) for maximum power output.

Place the PROC switch in the ON position. Adjust T₁₇₀₅ and T₁₇₀₆ (NB UNIT) for maximum power output.

Connect the DC probe of a VTVM to pin 13 of MJ₆. Set the output of the audio signal generator to 15 mV. Switch the PROC control on and off, and adjust VR₁₇₀₂ (NB UNIT) for an identical VTVM reading with the RF processor on and off.

Turn the PROC switch off, and adjust the audio signal generator to secure a power output of 5 watts while transmitting. Now place the PROC switch ON, and adjust VR₁₇₀₁ (NB UNIT) for a reading of 10 watts output on the wattmeter.

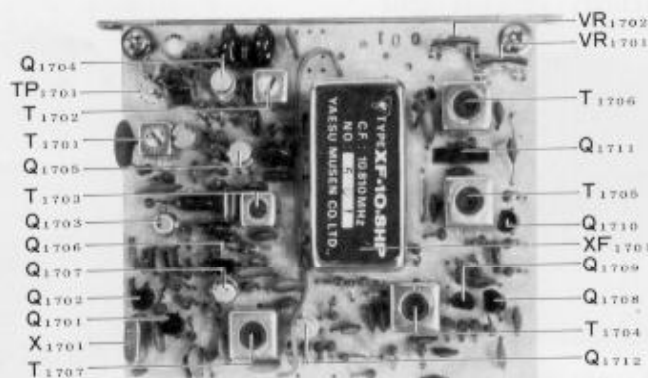
NOISE BLANKER ALIGNMENT

Preset the controls as follows:

BAND 52
VFO 0
TUNE 52 MHz position
ATT OFF

Connect a signal generator to the antenna receptacle. Apply a 40 dB signal from the generator to the transceiver frequency, and connect a DC voltmeter to TP₁₇₀₁ (NB UNIT). Place the NB switch ON.

Adjust T₁₇₀₁–T₁₇₀₃ (NB UNIT) for a minimum reading on the DC voltmeter.



NB. PROC UNIT (PB-1866)

RF UNIT

Apply the output from a sweep generator to gate 1 of Q₁₀₂, located on the RF UNIT. Connect an oscilloscope to the drain of Q₁₀₄. Adjust T₁₀₅ and T₁₀₆ until the scope pattern shown in Fig. 5 is obtained.

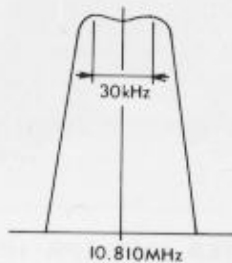


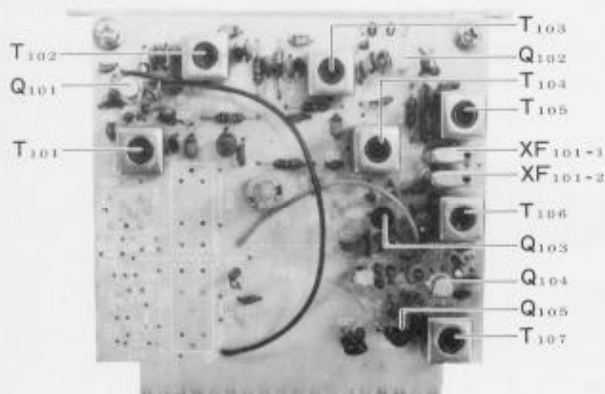
Fig. 5

Set the controls as follows:

BAND 52 MHz
 VFO 0
 TUNE 52 MHz position

Connect a signal generator to the antenna receptacle.

Apply a 10 dB signal from the signal generator, and tune the generator output to the transceiver receiving frequency. Adjust T₁₀₁-T₁₀₄ and T₁₀₇ (RF UNIT), T₃₀₁ (FILTER UNIT), and T₂₀₂-T₂₀₃ (SSB IF UNIT) for a maximum S-meter deflection. The adjustment of these cores should be performed several times to ensure peaking.



RF UNIT (PB-1853)

FM IF UNIT

Preset the controls as follows:

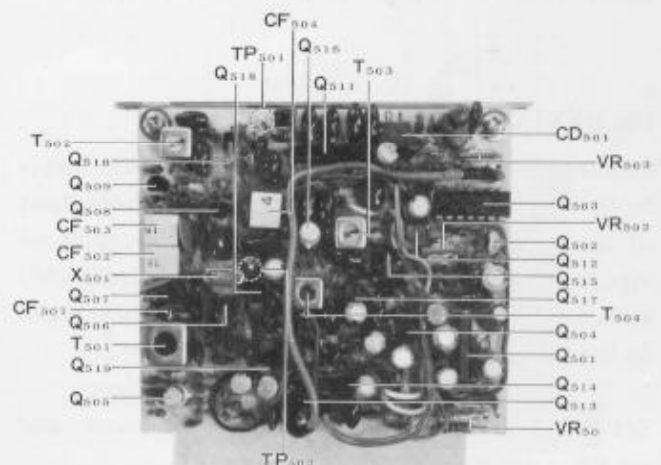
BAND 52
 VFO 0
 TUNE 52 MHz position
 ATT OFF
 MODE AM

Connect a signal generator to the antenna receptacle, and apply a 20 dB signal to the transceiver frequency. Connect a DC voltmeter to TP₅₀₂ (FM IF UNIT).

Adjust T₅₀₁, T₅₀₃, and T₅₀₄ for a minimum reading on the voltmeter.

Place the MODE switch in the FM position, and set the signal generator output to 40 dB. Connect the DC voltmeter to TP₅₀₁ (FM IF UNIT).

Adjust T₅₀₂ for a maximum reading on the voltmeter.



FM IF UNIT (PB-1856)

SQUELCH LEVEL ALIGNMENT

Press the controls as follows:

BAND 52
 VFO 0
 TUNE 52 MHz position
 MODE FM
 ATT OFF

Connect a signal generator to the antenna receptacle. Apply a 0 dB, 1 kHz modulated tone (70% modulation) to the transceiver frequency. Rotate the SQUELCH control fully clockwise.

Adjust VR₅₀₃ (FM IF UNIT) to the threshold point where the receiver is just silenced.

Remove the generator signal. With no signal present, the receiver should remain quieted until the SQUELCH control is rotated to approximately the 10 o'clock position.

AMGC ALIGNMENT

Connect a DC voltmeter to pin 4A of MJ₈. Apply an audio signal of 1 kHz @ 0.7 mV to the microphone jack. Place the AMGC switch in the ON position, and adjust VR₅₀₁ (FM IF UNIT) for a reading of 8 volts on the voltmeter.

Set the audio input level to 0.8 mV, and adjust VR₅₀₁ for a reading of 0 volts.

Now adjust the delay time for the AMGC. Remove the audio input, and after 0.5 second, the voltage should again read 8 volts. VR₅₀₂ adjusts the delay time. Clockwise rotation increases the delay time.

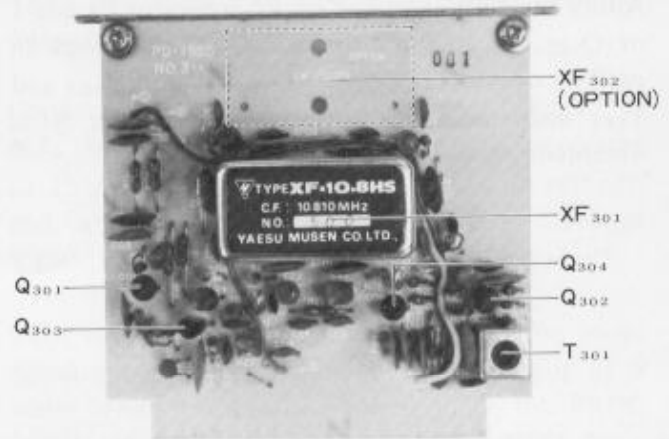
FM DEVIATION ADJUSTMENT

Connect a dummy load and an FM deviation meter to the antenna receptacle, and connect the output of an audio signal generator to the microphone input. Set the MODE switch to FM, set the BAND switch to 52, the VFO to 0 and the TUNE control to the 52 MHz position. Refer to Fig. 6 .

Set VR₅₀₁ (MIC AMP UNIT) fully clockwise, and set VR₅₀₄ to the center of its range.

Connect a frequency counter to pin 12 of the MIC AMP UNIT, and ensure that the audio signal generator is off. Adjust L₆₀₄ for a reading of precisely 10.8100 MHz on the counter.

Apply a 1 kHz, 25 mV signal from the audio generator. Adjust VR₆₀₂ for a deviation of 5 kHz. Now reduce the audio input level to 2.5 mV. Adjust VR₆₀₃ for a deviation of 3.5 kHz.



FILTER UNIT (PB-1855)

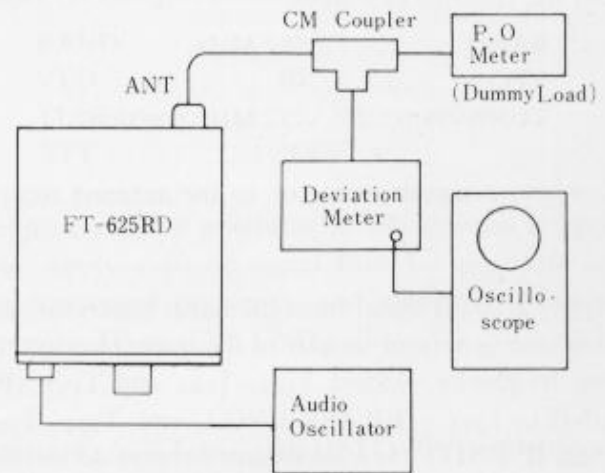


Fig. 6

COUNTER UNIT

Apply the output from a sweep generator to the gate of Q₁₈₀₁ (COUNTER UNIT). Connect an oscilloscope to pin 2 of Q₁₈₀₂. Adjust T₁₈₀₁ and T₁₈₀₂ until the waveform shown in Fig. 7 is obtained.

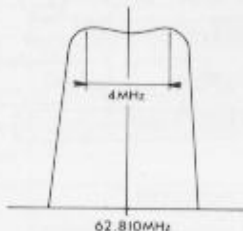


Fig. 7

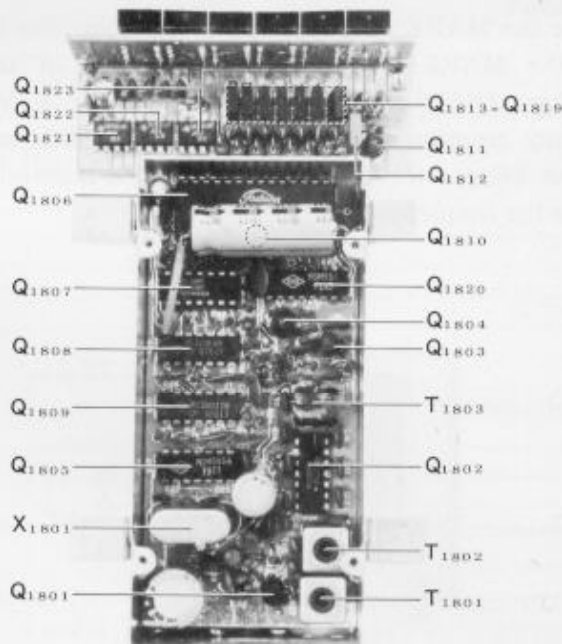
COUNTER LOCAL ALIGNMENT

Connect a DC voltmeter to TP₂₁₀₁ (COUNTER LOCAL UNIT). Place the MODE switch in the AM position. Adjust T₂₁₀₁ and T₂₁₀₂ for a maximum reading on the voltmeter.

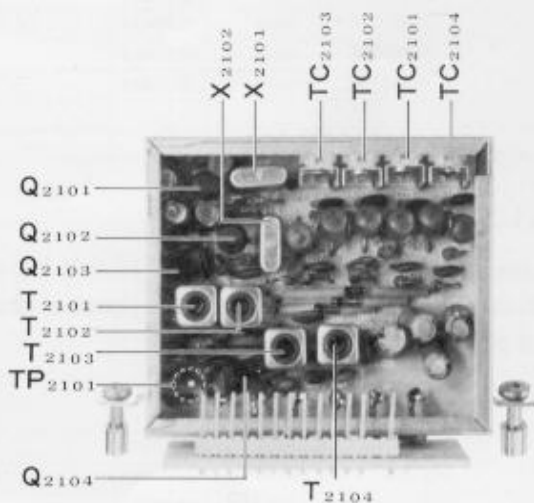
Connect a 56 ohm resistor between pin 6 of PB-1802 (connector board for PB-1869) and ground. Connect the RF probe of a VTVM to pin 6. Adjust T₂₁₀₃ and T₂₁₀₄ for a maximum reading on the VTVM.

Disconnect the VTVM, and connect a precision frequency counter to pin 6. Adjust the trimmer capacitors shown for the MODE switch positions indicated in the chart below.

MODE	TRIMMER	FREQUENCY
USB	TC ₂₁₀₁	56.8115 MHz
CW	TC ₂₁₀₂	56.8107 MHz
FM	TC ₂₁₀₃	56.8100 MHz
LSB	TC ₂₁₀₄	56.8085 MHz



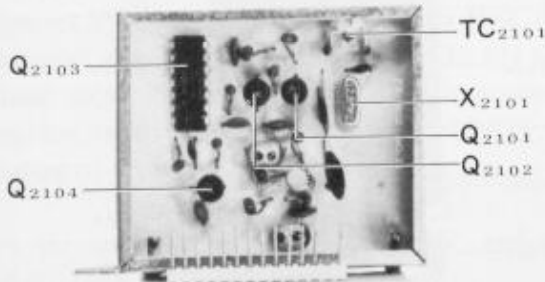
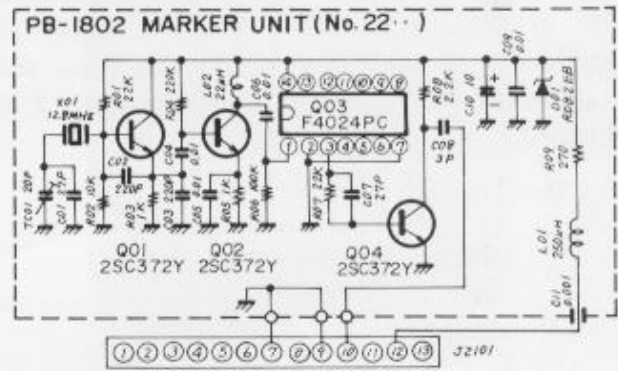
COUNTER UNIT (PB-1867)



OSC UNIT (PB-1869)

MARKER CALIBRATION (FT-625R only)

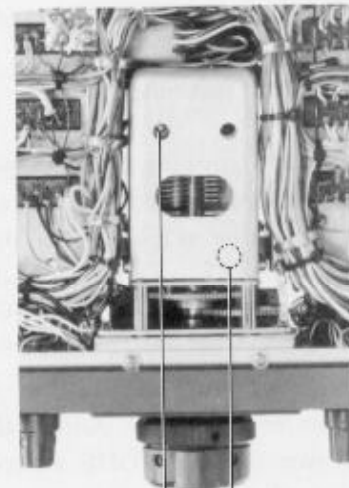
Place the MARK switch in the ON position. Pin 10 of the MARKER UNIT is the output of the marker. Use the fundamental output of a frequency counter such as the Yaesu YC-500, and adjust TC₂₂₀₁ for a zero beat against the harmonic from the frequency counter.



MARKER UNIT (PB-1802)

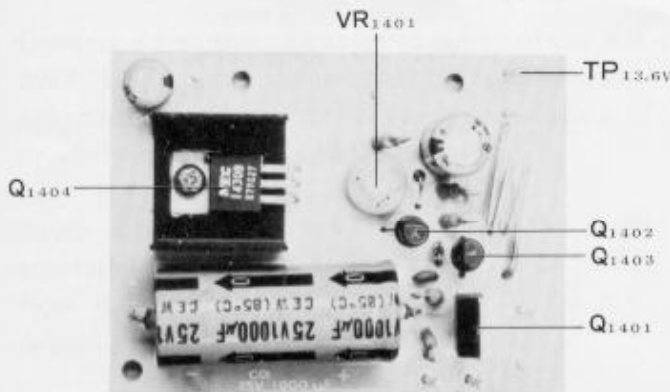
REG UNIT

VR₁₄₀₁ provides adjustment of the 13.6 V DC output from the REG UNIT. The test point is shown in the photograph.



TC₁₃₀₁ TC₁₃₀₂

VFO COMPARTMENT



Regulator unit (PB-1756)

FT-625RD PARTS LIST

MAIN CHASSIS				POWER TRANSFORMER		
Symbol Number	Parts Number	Description	PT1	52000052	52-56	# 230015B
IC & TRANSISTOR						
Q2,5	25000116	IC μ PC14308				
Q3	25000109	" μ PC14305				
Q1	22490003	Transistor MJ-802				
			M1(with PL3)	74000370	METER SP-38A	
DIODE						
D1	21090130	Silicon U05B			SPEAKER	
D3-15	21090011	" 10D1	SP1	76000017	4 Ω 3W	SA-77KY
D2	21090144	Bridge Rectifier Module S15VB10				
RESISTOR						
R10	40143680	Carbon Film $\frac{1}{4}$ W VJ 68 Ω	RL1	70000005	AE-3171-42	
R9,11	40143121	" " " " 120 Ω	RL2	70000031	BR211D012M	
R2	42124100	" Composition $\frac{1}{2}$ W GK10 Ω	PB-1829	60418290	RL2, Support Board	
R13	42124270	" " " " 27 Ω				
R1	42124101	" " " " 100 Ω				
R12,14	42124181	" " " " 180 Ω			RELAY SOCKET	
R4,5	42124102	" " " " 1K Ω	RLS	69000004	AE-3860	
R8	42144223	" " $\frac{1}{4}$ W " 22K Ω				
R7	42144274	" " " " 270K Ω				
POTENTIOMETER						
VR1	49800110	DM10A041A 10K Ω C/10K Ω A	S1	61000531	Channel	SRN1026N
VR2	49800111	DM10A041A 10K Ω B/100K Ω B	S2,4	64000520	Band	SRN2064N
VR3	49900098	DM10A041 5K Ω B/10K Ω A	S3	61000533	Mode	SRN4086N
VR4	49800112	DM11A5M1112 10K Ω B/10K Ω A	S5	64000200	Power	SP-2022
VR5	49900100	EVH, HOAS25B54 50K Ω B				
CAPACITOR						
C14	31829010	Ceramic Disc 50WV SL 1PF	P1	68130002	5047-13	
C1,2	30240472	" " 1.4KV 0.0047 μ F	P2	68100012	5047-10	
C15-19,23-25	30820103	" " 50WV 0.01 μ F	P3	67040002	SI 5908	
C6-13	30820473	" " " 0.047 μ F			RECEPTACLE	
C20-22	35220476	Electrolytic 16WV T 4.7 μ F	J1	67040004	POWER	QMS-AB4M
C26	34120107	" 10WV " 100 μ F	J2	68050003	TONE IN	CS-250
C5	34320227	" 16WV " 220 μ F	J3	68020002	KEY	SG-7615
C4	35220228	" " R 2200 μ F	J4	68020012	EXT SP	SG-8050
C3	34529001	" 35WV " 6800 μ F	J5	68040003	MIC	FM-144S
			J6	68020013	PHONE	SG-8018
			J7-10,14	68020001	REMOTE	CN-7017J
TRIMMER CAPACITOR			J11	68090001	BOOSTER	SB-7702
TC1	39000005	ECV-1ZW 50 \times 32 50PF	J12 (with wire)	68060018	MEMORY	# 240087
MICRO INDUCTOR						
L1,2,3	53020013	LA104N 151K 150 μ H	MJ1-6,9,10,11	68180003	121S-18B-105 18P	
			MJ7,8,12	68360001	22D-36B-205 36P	
AF CHOKE						
CH1	55003001	SN8S-500			FUSE	
CH2	50000010	50-12 # 230012	F1	73000003	3A (100V~117V)	
				73000002	2A (200V~234V)	

FT-625RD PARTS LIST

		FUSE HOLDER		C113	31827180	Ceramic Disc	50WV UJ	18PF
FH1	69030001	SN1001	#2	C101,108,110	31827470	"	"	47PF
				C104,112,121~123	30820102	"	"	0.001μF
				C103,105,106,114	30820103	"	"	0.01μF
				116~118,120,124~127,129				
		LAMP						
PL1,2	14000018	BQ044-32751A		C131	36825103	Mylar	"	0.01μF
PL3	—	(Meter Lamp)		C130	34220106	Electrotic	16WV T	10μF
				C128	34220476	"	"	47μF
						MICRO INDUCTOR		
				L101	53020006	FL4H6R8K		6.8μH
				L102	53020024	FL5H270K		27μH
				L103	53020023	FL5H101K		100μH
RF UNIT								
Symbol Number	Parts Number	Description		TRANSFORMER				
PB-1853	60418530	Printed Circuit Board		T101~103	55000308			#220407A
	018530AZ	P. C. B. with components		T104	55000309			#220408
				T105,107	54140730	R12-4073		#220149
				T106	54140740	R12-4074		#220150
		FET & TRANSISTOR		SSB IF UNIT				
Q103	22800195	FET	2SK19GR	Symbol Number	Parts Number	Description		
Q102	23800510	"	3SK51	PB-1854	60418540	Printed Circuit Board		
Q101,104	23800594	"	3SK59Y		018540AZ	P. C. B with components		
Q105	22318154	Transistor	2SC1815Y					
						IC, FET & TRANSISTOR		
				Q204	25000152	IC		μPCI037H
				Q205	22800195	FET		2SK19GR
		DIODE		Q201~203	23800594	"		3SK59Y
D112	21010070	Germanium	1S1007	Q206	22105641	Transistor		2SA564A-R
D105	21090142	Silicon	MC301	Q209	22310005	"		2SC1000GR
D101,103,104,106	21022090	Varactor	1S2209	Q207,208,210	22318154	"		2SC1815Y
D102,107	21090138	Varistor	MV103					
						DIODE		
				D203,204	21001880	Germanium		1S188FM
				D201,202	21090138	Varistor		MV-103
		MONOLITHIC FILTER						
XF101	71000033	HGM10N2A2	#210111					RESISTOR
				R209,210,216,217,222	40143560	Carbon Film	¼W VJ	56Ω
				R201,205	40143680	"	"	68Ω
		RESISTOR		R225,248	40143101	"	"	100Ω
R123,124	40143560	Carbon Film	¼W VJ 56Ω	R221	40143221	"	"	220Ω
R114	41143101	"	"	TJ 100Ω	R207,214,229,230,233,244	"	"	1KΩ
R116	40143101	"	"	VJ 100Ω	R241	"	"	1.2KΩ
R112	40143221	"	"	220Ω	R231	"	"	1.5KΩ
R109	41143102	"	"	TJ 1KΩ	R250	"	"	2.2KΩ
R105,118,122	40143102	"	"	VJ 1KΩ	R224,236,240	"	"	3.3KΩ
R128	40143472	"	"	4.7KΩ	R249	"	"	4.7KΩ
R119	40143822	"	"	8.2KΩ	R227,247	"	"	5.6KΩ
R113,125,126,127	40143103	"	"	10KΩ	R234	"	"	8.2KΩ
R103,120	40143223	"	"	22KΩ	R204,208,213,215,239	"	"	10KΩ
R108,111	40143473	"	"	47KΩ	R238	"	"	15KΩ
R125	40143683	"	"	68KΩ	R218	"	"	22KΩ
R101,106,107,110	41143104	"	"	TJ 100KΩ	R243,246	"	"	27KΩ
R102,115,117,121	40143104	"	"	VJ 100KΩ	R203,211,245	"	"	39KΩ
R104	40143225	"	"	2.2MΩ	R237,242	"	"	47KΩ
					R220	"	"	56KΩ
		CAPACITOR		R202,212,219	40143104	"	"	100KΩ
C109	31829059	Ceramic Disc	50WV SL 0.5PF	R232	40143184	"	"	180KΩ
C107	31829010	"	"	1PF	R228	"	"	220KΩ
C119	31820020	"	"	2PF	R226	"	"	1MΩ
C102,111,115	31829150	"	"	15PF	R235	"	"	1.5MΩ
C143	31820020	"	"	CH 2PF				
C141	31820040	"	"	4PF				
C140,142	31820050	"	"	.5PF				

FT-625RD PARTS LIST

		POTENTIOMETER					CRYSTAL FILTER	
VR202	49906103	EVL-SOAA	00B14	10KΩB	XF301	71000034	XF10.8HS	# 210112
VR201	49906503	"	00B54	50KΩB	XF302 (OPTION)	71000035	XF10.8HC	# 210113
VR203	40906504	"	00B55	500KΩB				
RESISTOR								
		CAPACITOR			R305,307,311,312	41143101	Carbon Film	1/4W TJ 100Ω
C201,207,212,229	31829100	Ceramic Disc	50WV SL	10PF	318,321,326,327			
C216	31829180	"	"	"	18PF	R302,310,325	40143101	" " " VJ 100Ω
C231,232	31829101	"	"	"	100PF	R301,303,304,306,308	40143102	" " " " 1KΩ
C249,250	31829221	"	"	"	220PF	R309,319,320,322~324		
C204,208,238	30820102	"	"	"	0.001μF	R317	40143222	" " " " 2.2KΩ
C202	38820103	"	"	"	0.01μF	R328,329	40143103	" " " " 10KΩ
					(RD204YM 103Z)	R316	41143473	" " " TJ 47KΩ
C203,205,206,209,210 211,213,214,215,217 218,219,221,223,224 226~228,234,236,247	30820103	"	"	"	0.01μF	R315	40143473	" " " VJ 47KΩ
						R313,314	40143104	" " " " 100KΩ
C230	30820473	"	"	"	0.047μF			
C244	36825102	Mylar	"	"	0.001μF			
CAPACITOR								
C243	36825472	"	"	"	0.0047μF	C320	31820090	Ceramic Disc 50WV CH 9PF
C248	36825103	"	"	"	0.01μF	C311	31820100	" " " " 10PF
C233	36825223	"	"	"	0.022μF	C314,316	31829470	" " " SL 47PF
C235	36226225	Tantalum	16WV	2.2μF		C317	30820102	" " " 0.001μF
C239,241,245	34820105	Electrolytic	50WV T	1μF		C301,305~309,312,319	30820103	" " " 0.01μF
C220,222,237,240	34220106	"	16WV T	10μF		323~326,330,331		
C225,242,246	34120476	"	10WV	47μF		C302~304,310,313,315	30820473	" " " 0.047μF
						C318,321,322,327~329 332,333		
MICRO INDUCTOR								
L201,202	53020009		FL7H	1mH				
L203	53020012		FL4H	1.2μH				
						L301~306	53020013	FL-5H 150μH
TRANSFORMER								
T201,202	54140730	R12-4073		# 220149				
T203	54140740	R12-4074		# 220150	T301	54140730	R12-4073	# 220149
FERRITE BEADS								
FB	56000024	RI 3×3×1					91100011	MS-60121
PIN TERMINAL								
AF UNIT								
		FILER UNIT			Symbol Number	Parts Number	Description	
Symbol Number	Parts Number	Description			PB-1764A-3380	60417641	Printed Circuit Board	
PB-1855	60418550	Printed Circuit Board				017641BZ	P.C.B with components	
	018550AZ	P.C.B with components						
IC, FET & TRANSISTOR								
					Q415	25000111	IC	MC14011B
					Q416,417	22800304	FET	2SK30AY
		FET & TRANSISTOR			Q412	22105641	Transistor	2SA564A
Q301,302,304	22800195	FET	2SK19GR		Q404	22106950	"	2SA695
Q303	22318154	Transistor	2SC1815Y		Q406	22205290	"	2SB529
					Q402,407,408,414	22303724	"	2SC372Y
					Q409,410,413,418	22303730	"	2SC373
					Q403	22307114	"	2SC711D
		DIODE			Q411	22307354	"	2SC735Y
D301~306	21010070	Germanium	1S1007		Q405	22403590	"	2SD359

FT-625RD PARTS LIST

		DIODE		C407	34220107	Electrolytic	16WV T	100μF
D401~404	21015550	Silicon	1S1555	C408,412	34220227	"	"	220μF
D405	29090013	Varistor	MV-5W					
		RESISTOR						
R416	40143100	Carbon Film	¼W VJ 10Ω	FM IF UNIT				
R456	40143680	"	" " " " 68Ω	Symbol Number	Parts Number	Description		
R414, 457	40143101	"	" " " " 100Ω	PB-1856	60418560	Printed Circuit Board		
R420	40143121	"	" " " " 120Ω		018560AZ	P.C.B with components		
R417	40143221	"	" " " " 220Ω					
R425, 449, 454	40143471	"	" " " " 470Ω					
R406, 408, 428, 430, 434, 441	40143102	"	" " " " 1KΩ					
R412, 413	40143152	"	" " " " 1.5KΩ			IC, FET & TRANSISTOR		
R424, 450	40143222	"	" " " " 2.2KΩ	Q501	25000134	IC	TA7063P	
R415	40143332	"	" " " " 3.3KΩ	Q503	25000111	"	MC14011B	
R440, 443, 445, 446, 448, 455	40143472	"	" " " " 4.7KΩ	Q511	25000118	"	μPC577H	
R429	40143562	"	" " " " 5.6KΩ	Q505,516	23800594	FET	3SK59Y	
R409	40143682	"	" " " " 6.8KΩ	Q502,504,506~510	22318154	Transistor	2SC1815Y	
R421, 427, 436, 438 439, 444, 452, 453	40143103	"	" " " " 10KΩ	512~515, 517, ~519				
R422, 442	40143223	"	" " " " 22KΩ					
R447	40143333	"	" " " " 33KΩ					
R426	40143393	"	" " " " 39KΩ					DIODE
R404, 410	40143473	"	" " " " 47KΩ	D502~506, 508~510	21001880	Germanium	1S188FM	
R435	40143563	"	" " " " 56KΩ	D501, 507	21015550	Silicon	1S1555	
R423	40143683	"	" " " " 68KΩ					
R411, 437	40143104	"	" " " " 100KΩ					
R405, 451	40143224	"	" " " " 220KΩ					
R458	41143224	"	" " " " TJ 220KΩ					THERMISTOR
R431, 432	40143105	"	" " " " VJ 1MΩ	TH501	29090001		SDT-250	
R418, 419	40124029	Wire Wound	½W " 0.22Ω					
R433	42144335	Carbon Composition	¼W GK 3.3MΩ					
		POTENTIOMETER						
VR404	49906202	EVL-SOAA	00B23 2KΩB					
VR403	49906103	EVL-SOAA	00B14 10KΩB					
VR402	49907053	EVL-VOAA	00B54 50KΩB					CERAMIC FILTER
VR405	49906503	EVL-SOAA	00B54 50KΩB	CF501	71200006	SFE-10.7MS		
VR401	49907504	EVL-VOAA	00B55 500KΩB	CF502, 503	71200016	LFB-15		
				CF504	71200022	LFB-4		
		CAPACITOR						
C438	31829151	Ceramic Disc	50WV SL 150PF					CERAMIC DISCRIMINATOR
C404	31829221	"	" " " " 220PF	CD501	70900001	SD455S4		
C434	31829271	"	" " " " 270PF					
C409	31829331	"	" " " " 330PF					
C427	30820102	"	" " " " 0.001μF					
C401	30820473	"	" " " " 0.047μF					RESISTOR
C423, 436, 437	36825103	Mylar	" 0.01μF	R547	40143560	Carbon Film	¼W VJ	56Ω
C431, 432, 433	36825223	"	" 0.02μF	R532, 581	41143101	"	"	TV 100Ω
C414, 417, 440	36825473	"	" 0.047μF	R521, 538, 572, 576	40143101	"	"	VJ 100Ω
C422	36526334	Tantalum	35WV 0.33μF	R518, 571	40143151	"	"	150Ω
C425	36526105	"	" 1μF	R523, 543	40143221	"	"	220Ω
C424	36526225	"	" 2.2μF	R508	40143331	"	"	330Ω
C403, 406, 415, 419, 428, 430	34820105	Electrolytic	50WV T 1μF	R507, 528	40143391	"	"	390Ω
C435	34220475	"	16WV " 4.7μF	R530, 546, 552	40143471	"	"	470Ω
C416, 418, 421, 426, 429	34220106	"	" " " 10μF	R501	41143102	"	"	TJ 1KΩ
C439	34120475	"	10WV " 47μF	R502, 519, 537, 570, 575	40143102	"	"	VJ 1KΩ
C405	34120107	"	" " " 100μF	R541, 563	40143152	"	"	1.5KΩ
C441	35120107	"	" " R 100μF					

FT-625RD PARTS LIST

R531,536,548,566	40143222	Carbon Film	¼WV VJ	2.2KΩ			TRANSFORMER	
579,580					T501	54140730	R12-4073	# 220149
R533,559,561,565	40143332	" "	" "	3.3KΩ	T502	54179430	R12-7943	
R524,545	40143472	" "	" "	4.7KΩ	T503	54179350	R12-7935	
R540,549,550,562,574	40143562	" "	" "	5.6KΩ	T504	54179470	R12-7947	
R504,509,512,513,514	40143103	" "	" "	10KΩ				
520,526,527,551,554								
564								
R515,534,535,539,542	40143223	" "	" "	22KΩ	T501,502	91100008	Wrapping Terminal C	
553,568,573								
R505	40143393	" "	" "	39KΩ				
R555	40143563	" "	" "	56KΩ				
R516,517,544,557,558	40143104	" "	" "	100KΩ				
560,567,569,577,578								
R503	40143154	" "	" "	150KΩ	MIC AMP UNIT			
R525	40143224	" "	" "	220KΩ	Symbol Number	Parts Number	Description	
R506,529,556	40143274	" "	" "	270KΩ	PB-1857	60418570	Printed Circuit Board	
R522	40143474	" "	" "	470KΩ		018570AZ	P.C.B with components	
R510	40143105	" "	" "	1MΩ				
R511	42144335	" Composition	¼W GK	3.3MΩ				
							FET & TRANSISTOR	
					Q603	22800195	FET	2SK19GR
		POTENTIOMETER			Q609	23800401	"	3SK40M
VR503	49906103	EVL-SOAA	00B54	10KΩB	Q610	22310005	Transistor	2SC1000GR
VR501	49906503	"	00B55	50KΩB	Q601,602,604~608	22318154	"	2SC1815Y
VR502	49906504	"	00B14	500KΩB	611~613			
							DIODE	
		CAPACITOR						
C528	31829050	Ceramic Disc	50WV SL	5PF	D605~608	21010070	Germanium	1S1007
C504,527,556	31829200	" "	" "	20PF	D601~604,609	21015550	Silicon	1S1555
C510,521,573	31829470	" "	" "	47PF	612~620			
C522,523	31829151	" "	" "	150PF	D610	21090108	Varactor	1S2209
C501,502,517,538	30820102	" "	" "	0.001μF	D611	29090004	Varistor	MV103
C516,518~520,524	30820103	" "	" "	0.01μF				
526,552								
C529,530	30820473	" "	" "	0.047μF				
C531,534,536,539,546	36825102	Mylar	"	0.001μF	CRYSTAL			
547,562,566,570,576					X601	71800119	HC-18/U	10.8085MHz # 210099
C579	36825472	"	"	0.0047μF	X602	71800120	"	10.8115MHz # 210100
C512,515,537,540,553	36825103	"	"	0.01μF	X603	71800121	"	10.810 MHz # 210101
554,558,577					X604	71800122	"	10.850 MHz # 210102
C548~550,578	36825223	"	"	0.022μF				
C507,532,533,535,541	36825473	"	"	0.047μF				
~545,557,561,565								
567~569,571,572								
							RESISTOR	
C514,564,580	36526104	Tantalum	35WV	0.1μF	R680	40143100	Carbon Film	¼W VJ 10Ω
C513	36526105	"	"	1μF	R679	40143470	" "	" " 47Ω
C503,551,582	34320105	Electrolytic	50WV T	1μF	R630	40143560	" "	" " 56Ω
C506	34820225	"	"	2.2μF	R605,609,610,616,618	40143101	" "	" " 100Ω
C559,560	34320475	"	25WV	4.7μF	634,643,654,677			
C505,508,525,563,574	34220106	"	16WV	10μF	R662	40143151	" "	" " 150Ω
575,581					R604,608,611,612,621	40143221	" "	" " 220Ω
C509,511	34120476	"	10WV	47μF	655,669			
					R619,622,629,639,646	40143471	" "	" " 470Ω
					660,670			
					R663	40143561	" "	" " 560Ω
		MICRO INDUCTOR			R601	40143681	" "	" " 680Ω
L501,502	53020001	FL-5H-102J		1mH	R615,617,620,633,642	40143102	" "	" " 1KΩ
					647			
					R656	40143182	" "	" " 1.8KΩ
					R653,676	40143222	" "	" " 2.2KΩ
					R624,664,671	40143272	" "	" " 2.7KΩ

FT-625RD PARTS LIST

R658	40143332	Carbon Film	1/4W	VJ	3.3KΩ			INDUCTOR		
R626, 627, 652, 678	40143472	"	"	"	4.7KΩ	I.601~603	53020001	FL-5H	102J	1mH
R638, 645, 657	40143562	"	"	"	5.6KΩ	I.604	55003256			# 220319
R603, 606, 631, 659, 665 666	40143103	"	"	"	10KΩ					
R602, 607, 632	40143123	"	"	"	12KΩ					
R649	40143153	"	"	"	15KΩ			TRANSFORMER		
R651	40143183	"	"	"	18KΩ	T601~603	54140730	R12-4073		# 220149
R635, 641, 644, 672, 673	40143223	"	"	"	22KΩ					
R636	40143333	"	"	"	33KΩ					
R640	40143473	"	"	"	47KΩ					
R628	40143683	"	"	"	68KΩ					
R625	40143823	"	"	"	82KΩ					
R613, 614, 637, 648, 650	40143104	"	"	"	100KΩ			EXCITER UNIT		
R667	40143184	"	"	"	180KΩ	Symbol Number	Parts Number	Description		
R674	40143224	"	"	"	220KΩ	PB-1858	60418580	Printed Circuit Board		
R623, 661, 668	40143274	"	"	"	270KΩ		018580AZ	P.C.B with components		
R675	40143394	"	"	"	390KΩ					
								IC. FET & TRANSISTOR		
		POTENTIOMETER				Q701	25000101	IC	MC-1496G	
VR601	49800113	PN822H	101V		100ΩB	Q702	23800510	FET	3SK51Y	
VR602	49906502	EVL-SOAA	00B53		10KΩB	Q704	22307300	Transistor	2SC730	
VR603	49906103	"	00B14		5KΩB	Q705	22307842	"	2SC784R	
						Q703	22320530	"	2SC2053	
						Q707	22318154	"	2SC1815Y	
						Q706	22390001	"	MPSA13	
		CAPACITOR								
C616, 645	31820050	Ceramic Disc	50WV	CH	5PF					
C610, 614	31820200	"	"	"	20PF					
C603, 604, 630	31820330	"	"	"	33PF			DIODE		
C619, 644	31820390	"	"	"	39PF	D701, 708~711	21015550	Silicon	1S1555	
C615	31820470	"	"	"	47PF	D702~705, 707	21022090	Varactor	1S2209	
C641, 642	31820101	"	"	"	100PF	D712	21090148	Zener	WZ034	
C607, 608, 631, 632	31820151	"	"	"	150PF					
C648	31829010	"	"	"	SL 1PF					
C640	31827040	"	"	"	UJ 4PF					
C637	31827101	"	"	"	100PF			RESISTOR		
C621, 657, 659	30820102	"	"	"	0.001μF	R725, 733	40143100	Carbon Film	1/4W	VJ 10Ω
C601, 602, 605, 606, 609 611~613, 617, 618 628, 633, 634, 638, 639 643, 646, 647, 649, 651 653, 655, 656, 672, 674	30820103	"	"	"	0.01μF	R702, 729 R703, 707, 709, 722, 726 731, 738	40143560 40143101	"	"	56Ω 100Ω
C668	36825682	Mylar	50WV		0.0068μF	R734, 736	49143471	"	"	470Ω
C669	36825102	"	"		0.001μF	R705	40143821	"	"	820Ω
C625	36825472	"	"		0.0047μF	R706, 728	40143102	"	"	1KΩ
C624, 671	36825103	"	"		0.01μF	R720	40143122	"	"	1.2KΩ
C650, 658	36825223	"	"		0.022μF	R701	40143222	"	"	2.2KΩ
C660	36226106	Tantalum	16WV		10μF	R724	40143332	"	"	3.3KΩ
C620, 623, 635, 636, 662 664, 667	34820105	Electrolytic	50WV T		1μF	R735	40143682	"	"	6.8KΩ
C626, 627, 665, 670	36220106	"	16WV	"	10μF	R717, 718	40143223	"	"	22KΩ
C654	34120336	"	10WV	"	33μF		40143393	"	"	39KΩ
C622, 629, 663, 666	34120476	"	"	"	47μF	R732	40143473	"	"	47KΩ
C661, 673	34120107	"	"	"	100μF	R711, 713, 715, 719, 721	40143104	"	"	100KΩ
						R737	40143105	"	"	1MΩ
						R712	40143105	Carbon Composition	1/4 GK	100Ω
						R727, 730	42124471	"	"	1/2W GK 470Ω
								"	"	1/4W GK 1.5KΩ
		TRIMMER CAPACITOR				R704		"	"	10KΩ
TC601~604	39000007	ECV-1ZW	20×40		20PF	R708, 716		"	"	100KΩ
						R710, 714		"	"	100KΩ

FT-625RD PARTS LIST

		INDUCTOR		C930	31829050	Ceramic Disc 50WV SL 5PF	
I.801,802,804	55003262		# 220324	C931	31829200	"	" " " " 20PF
I.803,813	55003086		# 220190	C932,933	31829201	"	" " " " 200PF
I.805	55003312		# 220410	C901~905,912~916	30820103	"	" " " " 0.01μF
I.806	55003093		# 220196				
I.807~811	55003313		# 220411			TRIMMER CAPACITOR	
I.812	55003311		# 220338	TC901~905	39000007	ECV-1ZW 20×40 20PF	
						MICRO INDUCTOR	
				L.901~905	53020001	FL-5H	1mH
		TRANSFORMER		L.912	53010003		250μH
T802	55003303		# 220413	L.913	53020012	FL-4H	1.2μH
T803	55003304		# 220414AB				
T804	55003305		# 220415			LOCAL UNIT	
				Symbol Number	Parts Number	Description	
				PB-1860	60418600	Printed Circuit Board	
					018600AZ	P.C.B with components	
		RELAY					
RI.801	70000031	BR221D012M				TRANSISTOR	
				Q1002	22303724	Transistor	2SC372Y
				Q1001	22307851	"	2SC785BN
						DIODE	
				D1013	21022090	Germanium	1S2209
				D1001~1006, 1007~1012	21015550	Silicon	1S1555
		FIX UNIT					
		Symbol Number	Parts Number	Description			
		PB-1750~3380	60417500	Printed Circuit Board			
			017500BZ	P.C.B with components			
						CRYSTAL	
				X1001	71800123	HC-18/U 70.01MHz	# 210105
				X1002	71800124	" 71.01MHz	# 210106
				X1003	71800125	" 72.01MHz	# 210107
Q901,902	22303724	2SC372Y		X1004	71800126	" 73.0MHz	# 210108
				X1005~1008	—	HC-25/U (OPTION)	# 210109
						DIODE	
D901~905	21015550	Silicon 1S1555					
						CRYSTAL SOCKET	
				XS1001~1004	69010012	HC-25/U	SD0105
						CRYSTAL	
X901~905	—	HC-25/U (OPTION) # 210104					
						RESISTOR	
				R1015,1017,1018	40143101	Carbon Film ¼W VJ	100Ω
				R1014	40143471	" " " "	470Ω
				R1002~1004	41143681	" " " "	TJ 680Ω
XS901	69010009	HC-25/U S-20 6P		R1001,1005~1009	40143681	" " " "	VJ 680Ω
				R1012,1013	40143101	" " " "	10KΩ
				R1010,1011	40143473	" " " "	47KΩ
				R1016	40143823	" " " "	82KΩ
						RESISTOR	
R905,908,909	40143101	Carbon Film ¼W VJ 100Ω					
R904	40143221	" " " " 220Ω					
R901	40143152	" " " " 1.5KΩ		C1009	31820470	Ceramic Disc 50WV CH 47PF	
R902,907,910	40143562	" " " " 5.6KΩ		C1017	31829050	" " " " SL 5PF	
R906	40143822	" " " " 8.2KΩ		C1011	31827050	" " " " UJ 5PF	
R903	40143223	" " " " 22KΩ		C1015	31827100	" " " " 10PF	
				C1014	31827470	" " " " 47PF	
				C1010,1013,1016,1020	30820102	" " " " 0.001μF	
				C1001~1004,1005~1008 1012,1018	30820103	" " " " 0.01μF	
						CAPACITOR	
C917~921	31820300	Ceramic Disc 50WV CH 30PF		C1019	30820473	" " " " 0.047μF	
C929	31820101	" " " " 100PF					
C928	31820201	" " " " 200PF					

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REG BOARD						SWITCH	
Symbol Number	Parts Number	Description					
PB-1756A	60417561	Printed Circuit Board	S1501,1505	64000101	SEL. 62301		
	017561AZ	P.C.B with components	S1502,1503	64000103	SLE 62251		
			S1504	64000108	SLE 64251		
IC & TRANSISTOR							
Q1404	25000116	IC μ PC14308S					
Q1402,1403	22303724	Transistor 2SC372Y	PUSH SWITCH BOARD				
Q1401	22402350	" 2S1313					
				Symbol Number	Parts Number	Description	
				PB-1865	60418650	Printed Circuit Board	
					018650AZ	P.C.B with components	
DIODE							
D1401	21015550	Silicon 1S1555					
D1402	21090043	Zener WZ090	DIODE				
				D1604,1606	21090011	Silicon	10D1
				D1601~1603,1605	21090140	LED	GD4-203-SRD
RESISTOR							
R1401	40143331	Carbon Film $\frac{1}{4}$ W VJ 330 Ω					
R1406	40143471	" " " " 470 Ω	RESISTOR				
R1402	40143561	" " " " 560 Ω	R1606	42124220	Carbon Composition $\frac{1}{2}$ W GK 22 Ω		
R1403	40143821	" " " " 820 Ω	R1604	42124221	" " " " 220 Ω		
R1404	40143272	" " " " 2.7K Ω	R1601~1603	42124471	" " " " 470 Ω		
R1406	44144059	Wire Wound " 0.05 Ω	R1605	42144563	" " " " 5.6K Ω		
POTENTIOMETER							
VR1401	49905471	SR19R 470 Ω B	VR1601	49906503	EVL-S0AA 00B54 50K Ω B		
CAPACITOR							
C1402	30820102	Ceramic Disc 50WV 0.001 μ F	S1601~1604	65000036	MB-0202AA2060 B-2U-EE		
C1404	34220476	Electrolytic 16V V T 47 μ F	S1605	65000037	MB-0201AA2060 B-2U-0A		
C1403	34220227	" " " " 220 μ F					
C1401	35320108	" 25WV R 1000 μ F					
				NB / PROCESSOR UNIT			
				Symbol Number	Parts Number	Description	
				PB-1866	60418660	Printed Circuit Board	
					018660AZ	P.C.B with components	
LEVER SWITCH BOARD							
Symbol Number	Parts Number	Description	IC, FET & TRANSISTOR				
PB-1864	60418640	Printed Circuit Board	Q1711	25000105	IC TA7060P		
	018640AZ	P.C.B with components	Q1703,1707	23800401	FET 3SK40M		
				Q1704,1705,1712	23800594	" 3SK59Y	
				Q1701,1702,1706 1708~1710	22318154	Transistor 2SC1815Y	
DIODE							
D1501	21010070	Germanium 1S1007					
				DIODE			
				D1701,1702	21010070	Germanium 1S1007	
RESISTOR				D1703~1706	21015550	Silicon 1S1555	
R1502	41143153	Carbon Film $\frac{1}{4}$ W TJ 15K Ω					
R1501	41143273	" " " " 27K Ω					
R1503,1504	42124471	" Composition $\frac{1}{2}$ W GK 470 Ω					

FT-625RD PARTS LITS

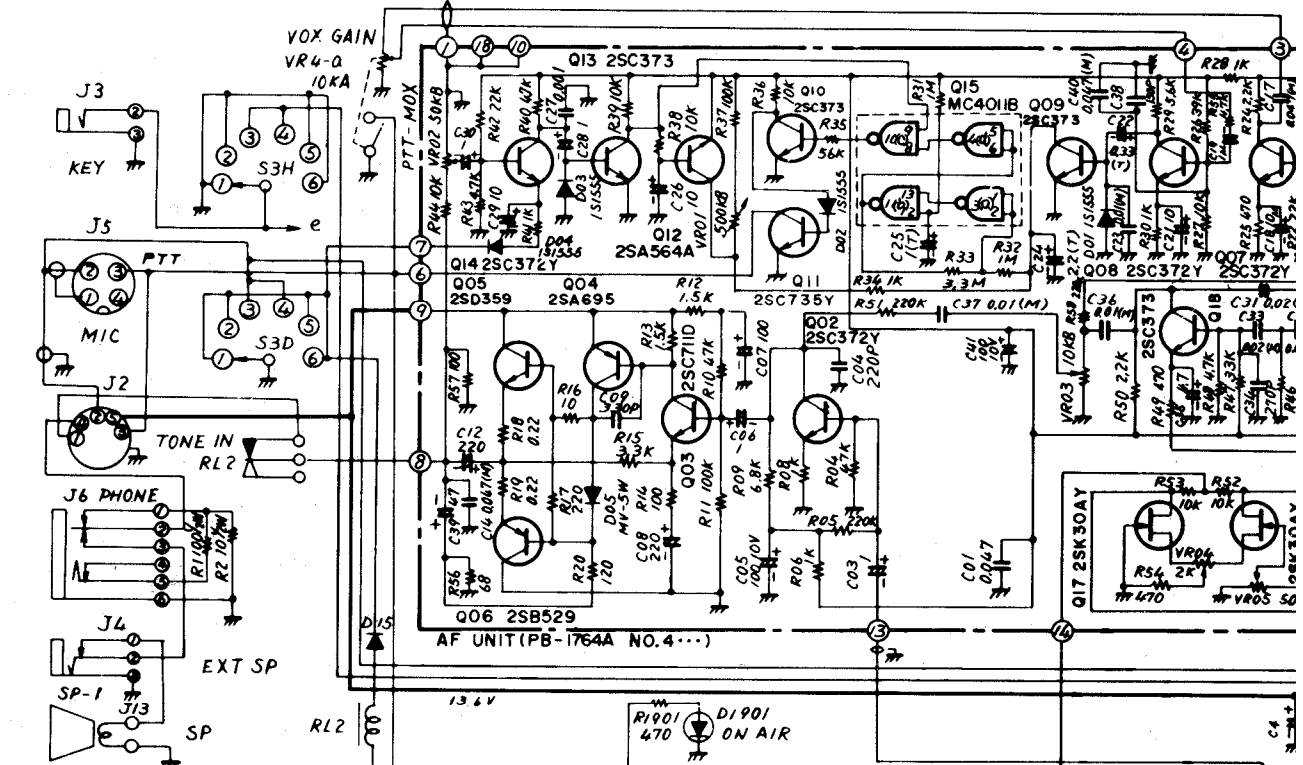
		CRYSTAL				TRANSFORMER	
X1701	71800127	HC-18/U 11.265MHz	# 210110	T1701,1702	54179430	R12-7943	
				T1703	54179470	R12-7947	
				T1704,1705	54140740	R12-4074	# 220150
				T1706,1707	54140730	R12-4073	# 220149
		CRYSTAL FILTER					
XF1701	71000036	XF10.8GA	# 210114				
				TP1701	91100008	Wrapping terminal C	
		RESISTOR					
R1750,1751,1757,1758	40143560	Carbon Film	1/4W VJ 56Ω				
R1710,1716,1723,1737 1739,1743,1744	40143101	" "	" " 100Ω				
R1714,1720	40143151	" "	" " 150Ω				
R1703,1707,1709	40143221	" "	" " 220Ω				
R1736,1742	40143471	" "	" " 470Ω				
R1728	40143561	" "	" " 560Ω	PB-1868	60418680	LED board	
R1701,1715,1721,1733 1745~1748,1756	40143102	" "	" " 1KΩ	PB-1867	60418670	Counter board	
R1738,1749,1752	40143222	" "	" " 2.2KΩ	PB-1803	60418030	Connector board	
R1705	40143472	" "	" " 4.7KΩ		018670AZ	Counter unit Assembly	
R1711,1717,1724,1730 1731,1735,1741	40143103	" "	" " 10KΩ				
R1722,1725,1755	40143223	" "	" " 22KΩ			IC, FET & TRANSISTOR	
R1734,1740,1754	40143333	" "	" " 33KΩ	Q1807,1809	25000153	IC	F4011
R1704,1708,1712,1713 1718,1719	40143473	" "	" " 47KΩ	Q1808	25000195	"	MC14069B
R1729	40143563	" "	" " 56KΩ	Q1820	25000085	"	MSM561
R1726,1753	40143104	" "	" " 100KΩ	Q1805	25000054	"	MSM5564
R1702,1732	40143184	" "	" " 180KΩ	Q1821~1823	25000154	"	SN75453
R1727	40143224	" "	" " 220KΩ	Q1802	25000104	"	SN76514
R1706	40143474	" "	" " 470KΩ	Q1806	25000148	"	TC5032P
				Q1801	22800195	FET	2SK19GR
				Q1812	22104963	Transistor	2SA496(O)
				Q1804,1810,1811	22303724	"	2SC372Y
				Q1813~1819	2230496	"	2SC496
		POTENTIOMETER		Q1803	22307842	"	2SC784R
VR1702	49906102	EVL-S0AA	00B13 1KΩB				
VR1701	49906502	" "	00B53 5KΩB				
						DISPLAY LED	
		CAPACITOR		DS1801~1806	21090135	5082-7740	
C1742	31829100	Ceramic Disc	50WV SL10PF				
C1704	31829470	" "	" " 47PF				
C1719,1722	31829560	" "	" " 56PF				
C1701,1703,1708 1728,1730,1732	31829101	" "	" " 100PF			DIODE	
C1705,1706	31829151	" "	" " 150PF	D1804,1805	21001880	Germanium	1S188FM
	31829201	" "	" " 200PF	D1801,1802	21015550	Silicon	1S1555
C1738,1743	30820102	" "	" " 0.001μF	D1803	21090011	"	10D1
C1702,1707,1725,1729 1731,1733~1737 1739~1741,1744~1746 1749,1750	30820103	" "	" " 0.01μF				
C1709,1710	30820473	" "	" " 0.047μF				
C1711,1715,1720	36825102	Mylar	" " 0.001μF				
C1712,1716,1723	36825103	" "	" " 0.01μF				
C1713,1714,1717 1718,1726	36825473	" "	" " 0.047μF				
C1721	34820105	Electrolytic	" T 1μF	R1843	40143470	Carbon Film	1/4W VJ 47Ω
C1724,1727	34220106	"	16WV " 10μF	R1841	40143680	" "	" " 68Ω
				R1844	40143820	" "	" " 82Ω
				R1802~1804,1834 1835~1840,1842	40143101	" "	" " 100Ω
				R1807	40143221	" "	" " 220Ω
				R1811,1826	40143471	" "	" " 470Ω

FT-625RD PARTS LIST

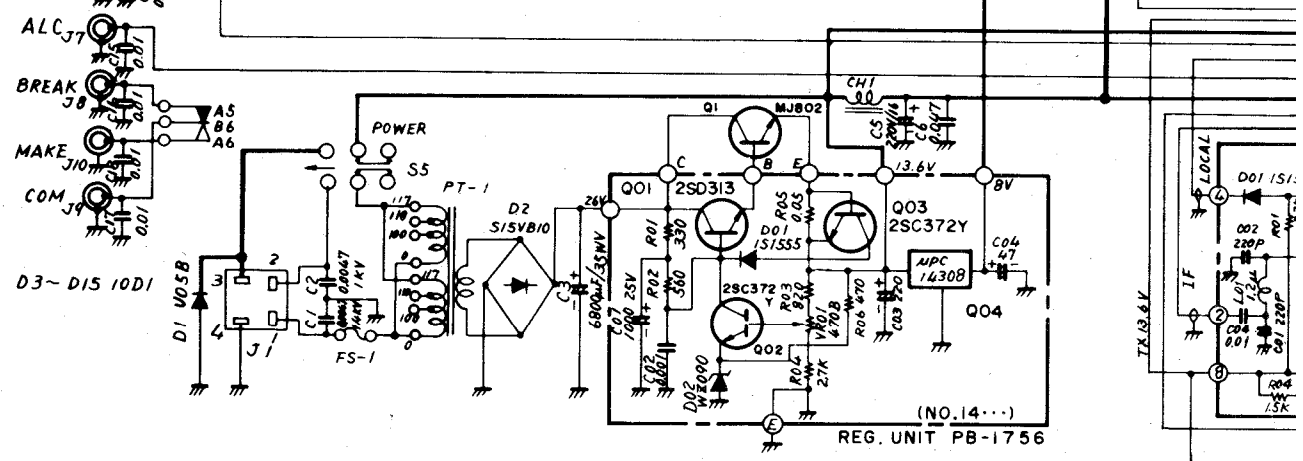
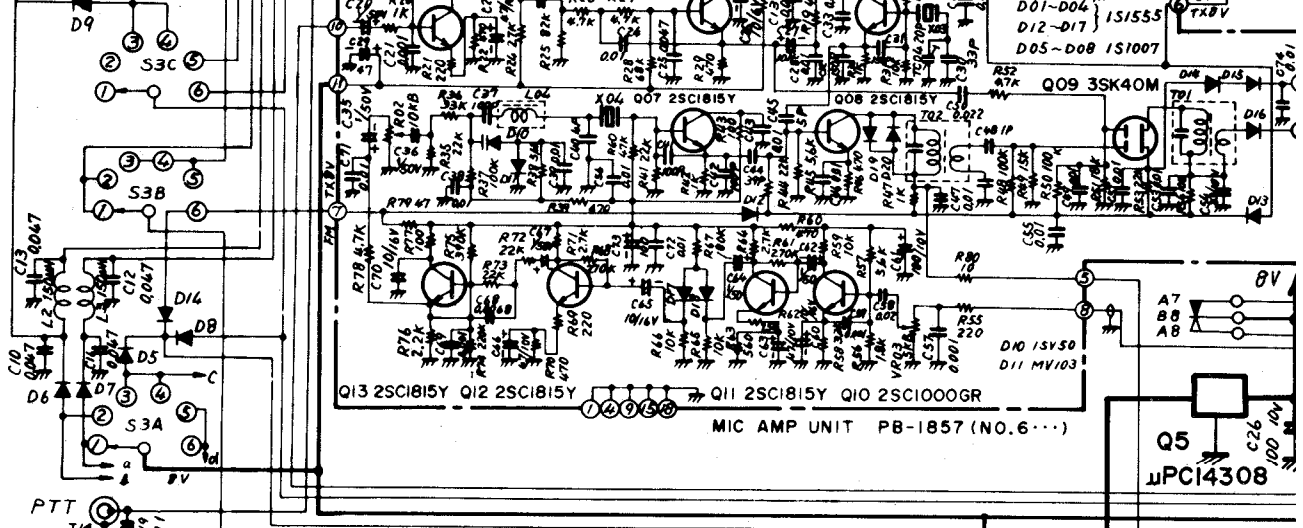
				LED BOARD		
Part No.	Code	Specs		Symbol Number	Parts Number	Description
R1808	40143102	Carbon Film 1/4W VJ 1KΩ				
R1821	40143222	" " " " 2.2KΩ				
R1805	40143392	" " " " 3.9KΩ		PB-1801	60418010	Printed Circuit Board
R1812, 1813, 1816, 1818 1820, 1825	40143103	" " " " 10KΩ			018010AZ	P.C.B with components
R1806, 1809, 1810	40143153	" " " " 15KΩ				
R1823	40143223	" " " " 22KΩ				
R1814, 1815, 1817	40143563	" " " " 56KΩ				DIODE
R1801, 1822	40143104	" " " " 100KΩ		D1901~1907	21090140	GD4-203SRD
R1824	40143105	" " " " 1MΩ				
R1827~1833	42124330	Carbon Composition 1/2W GK 33Ω				
R1819	42144566	" " 1/4W GK 5.6MΩ				
						RESISTOR
				R1902~1905	42124331	Carbon Composition 1/2W GK 330Ω
				R1901	42124471	" " " " 470Ω
						CAPACITOR
C1822, 1823	31820510	Ceramic Disc 50WV CH 51PF				
C1806	31829010	" " " " 1PF				
C1805, 1807	31829100	" " " " SL 10PF				
C1801	31829220	" " " " 22PF				
C1825~1829, 1832	31829221	" " " " 220PF				
C1808, 1811, 1838 1839~1842	30820102	" " " " 0.001μF				
C1802, 1804, 1809, 1810 1812~1821, 1824 1831, 1837, 1843, 1848	30820103	" " " " 0.01μF				
C1833	36226224	Tantalum 35WV 0.22μF				
C1845~1847	32821102	Feed Thru 50WV 0.001μF				FET
C1830, 1844	34220106	Electrolytic 16WV 10μF		Q2001	22800195	2SK19GR
C1803	34120337	" 6.3WV 330μF				
C1836	34220477	" 16WV 470μF				
C1849	35120108	" 10WV 1000μF				
						RESISTOR
				R2002, 2003	40143101	Carbon Film 1/4W VJ 100Ω
				R2001	40143104	" " " " 100KΩ
						MICRO INDUCTOR
L1801, 1802	53020034	FL4H 100K 10μH				
						CAPACITOR
				C2001	31820470	Ceramic Disc 50WV CH 471PF
						TRANSFORMER
				C2002, 2003	30820102	" " " " 0.001μF
T1801, 1802	55003293		# 220408			
T1803	55003174		# 220209			
						TRANSFORMER
				T2001	55003174	# 220209
						IC SOCKET
QS	68280001	116-28-30-114	28P			
QS	68140008	116-14-30-114	14P			
						OSC (COUNTER LOCAL) UNIT
				Symbol Number	Parts Number	Description
	91100008	Wrapping terminal C		PB-1869	60418690	Printed Circuit Board
				PB-1804	60418041	Connector Board
					018690AZ	OSC unit with components
						TRANSISTOR
				Q2101, 2102	22303730	Transistor 2SC373
				Q2103, 2104	22307104	" 2SC710D

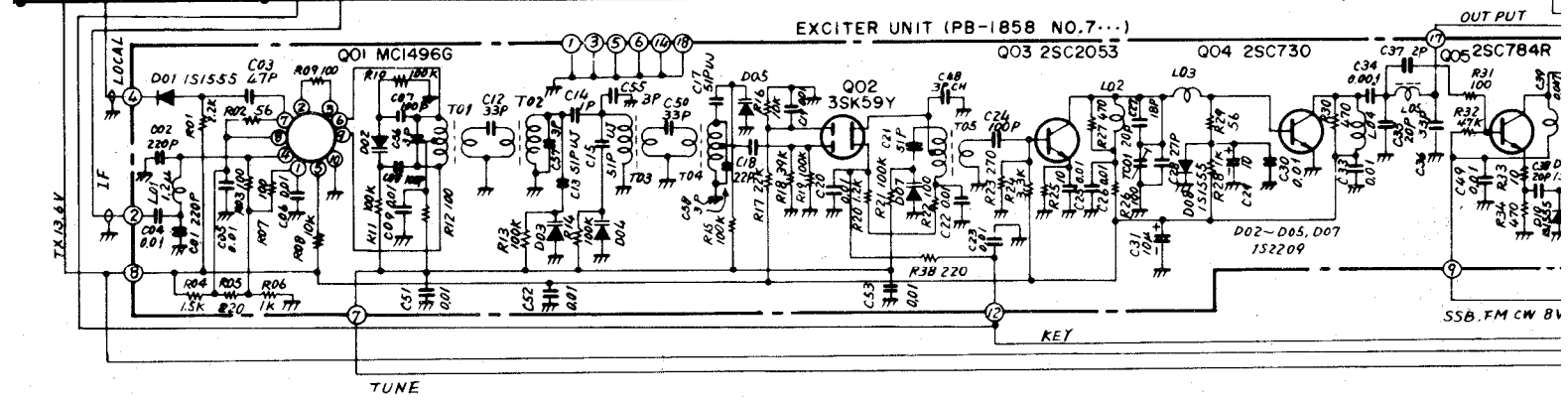
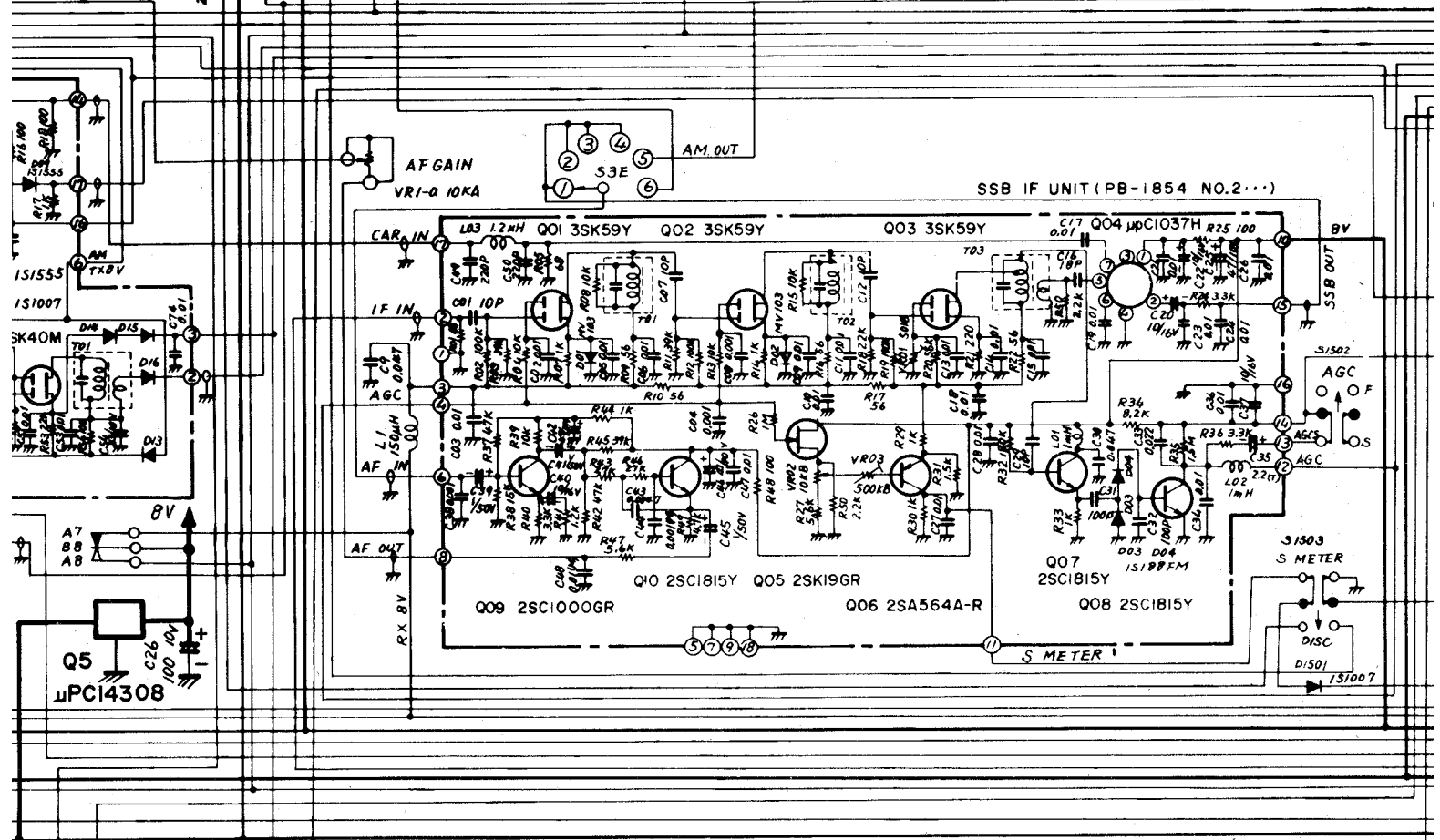
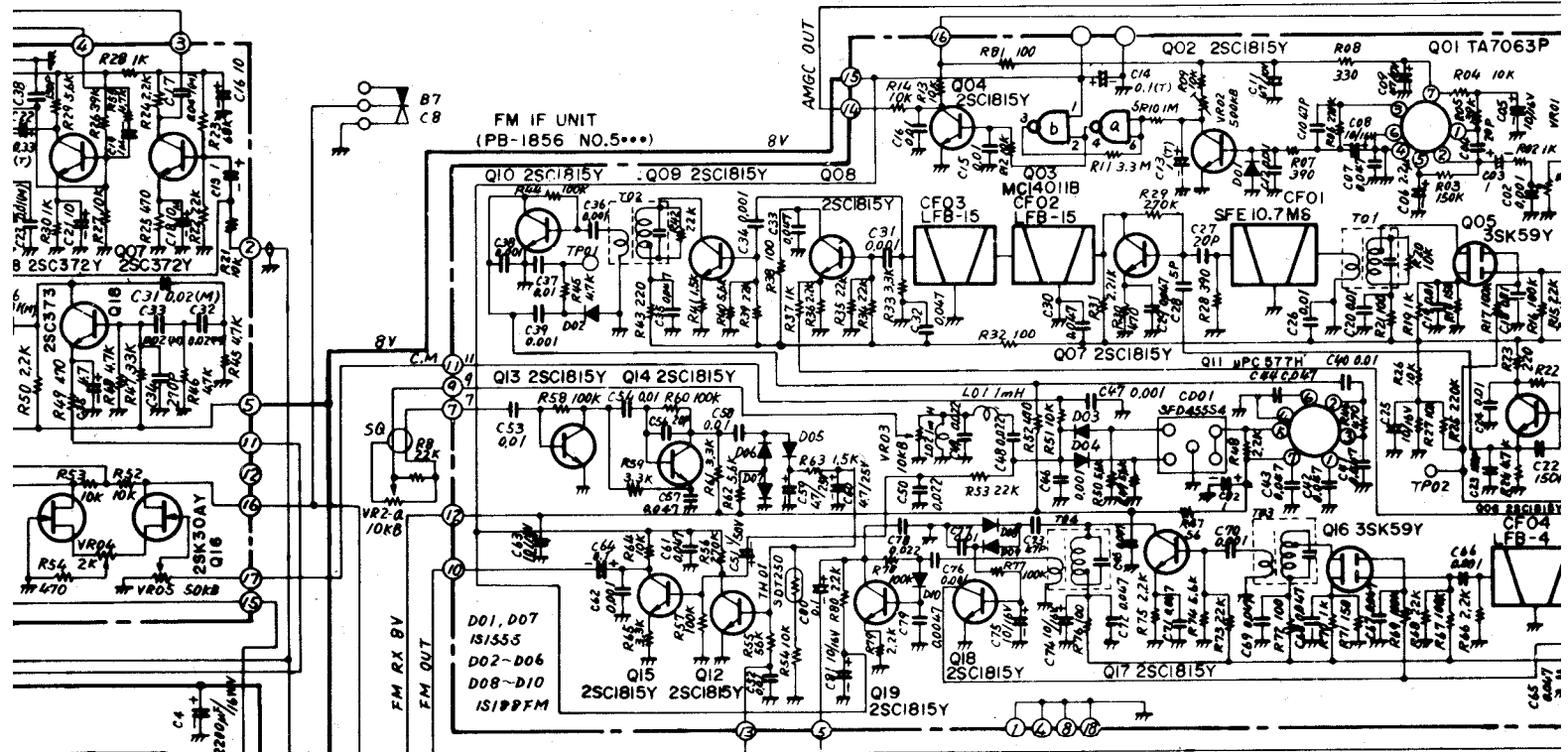
FT-625RD PARTS LIST

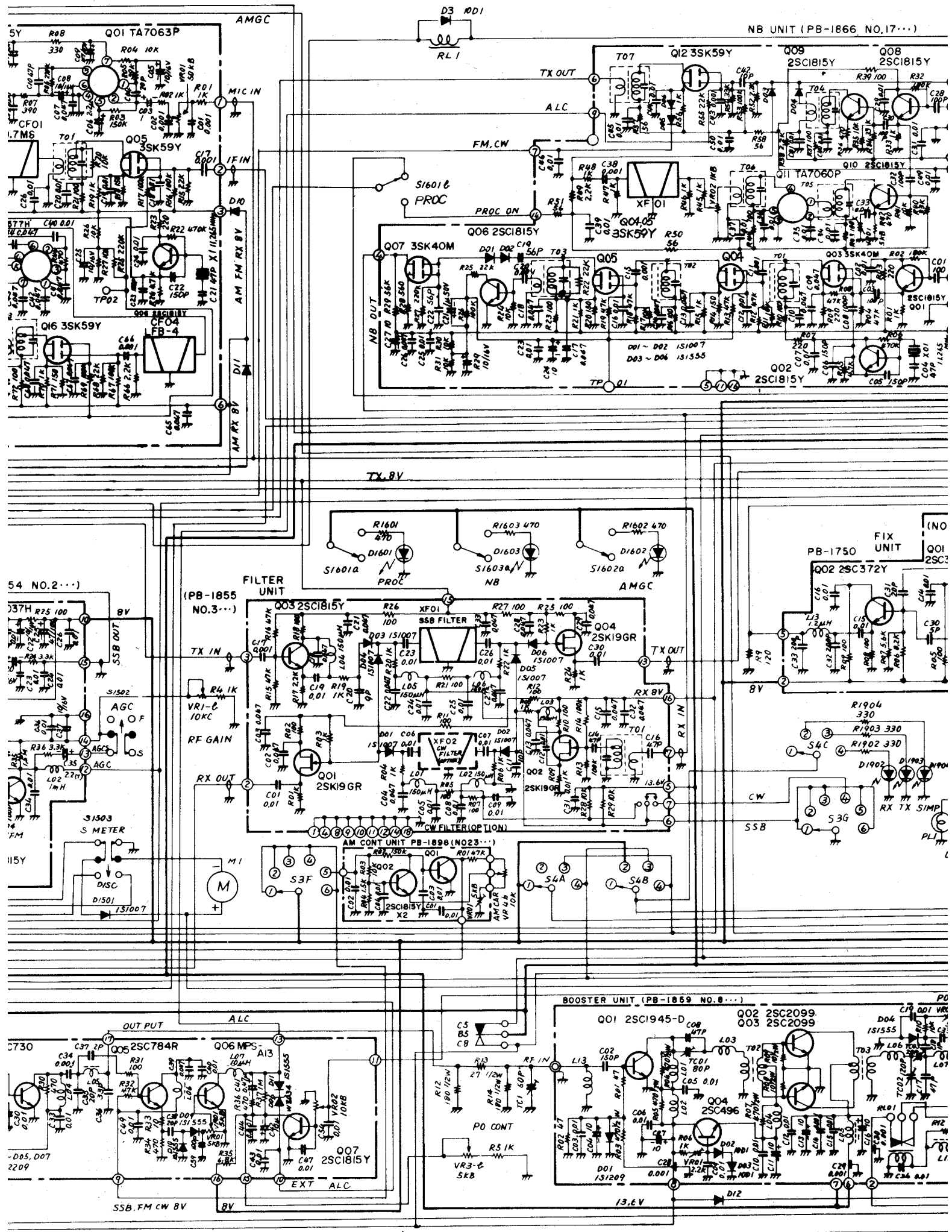
		DIODE			MARKER UNIT		
		Silicon	1S1555	Symbol Number	Parts Number	Description	
D2101~2104	21015550	"	MC301	PB-1802	60418020	Printed Circuit Board	
D2105~2108	21090142	"		PB-1804	60418040	Connector Board B	
					018020BZ	Marker unit with components	
		CRYSTAL					
X2101	71800128	HC-18/U 14.20269MHz #210118-1					
X2102	71800129	" 14.20223MHz #210118-2					IC & TRANSISTOR
				Q2203	25000108	IC	34024PC
				Q2201,2202,2204	22303724	Transistor	2SC372Y
		RESISTOR					
R2115,2119	41143101	Carbon Film	1/4W VJ	100Ω			
R2120	41143221	"	"	220Ω			
R2116	41143561	"	"	560Ω			DIODE
R2101~2106,2109 2112	41143102	"	"	1KΩ	D2201	21090139	Zener RD8.2EB
R2118	41143222	"	"	2.2KΩ			
R2114	41143472	"	"	4.7KΩ			
R2108,2111,2117	41143103	"	"	10KΩ			CRYSTAL
R2107,2110,2113	41143223	"	"	22KΩ	X2201	71800060	HC-18/U 12.8MHz
		CAPACITOR					RESISTOR
C2109~2112	31820470	Ceramic Disc	50WV CH	47PF	R2209	40143271	Carbon Film 1/4W VJ 270Ω
C2123,2130	31829010	"	"	SL 1PF	R2203,2205	40143102	" " " " 1KΩ
C2129	31829090	"	"	91PF	R2208	40143222	" " " " 2.2KΩ
C2116,2120,2131	31829100	"	"	101PF	R2202	40143103	" " " " 10KΩ
C2134	31829120	"	"	12PF	R2201,2207	40143223	" " " " 22KΩ
C2122	31829390	"	"	39PF	R2206	40143104	" " " " 100KΩ
C2124	31829470	"	"	47PF		40143224	" " " " 220KΩ
C2132	31829820	"	"	82PF			
C2125	31829151	"	"	150PF			
C2105~2108,2113 2117,2121,2126~2128 2133	30820103	"	"	0.01μF			CAPACITOR
C2115,2119	36824101	Styrol	"	100PF	C2201,2207	31820272	Ceramic Disc 50WV CH 27PF
C2114,2118	36824221	"	"	220PF	C2202,2203	31820221	" " " " 220PF
C2135~2139	32821102	Feed Thru	"	0.001μF	C2208	31829030	" " " " SL 3PF
C2101~2104	34220106	Electrolytic	16WV T	10μF	C2204~2206,2210	30820103	" " " " 0.01μF
					C2209	35220106	Electrolytic 16WV T 10μF
		TRIMMER CAPACITOR					TRIMMER CAPACITOR
TC2101~2104	39000008	ECV-1ZW	40×40	40PF	TC2201	39000007	ECV-1ZW 20×40 20PF
		MICRO INDUCTOR					
L2101~2106	53020001	FL-5H	102K	1mH			MICRO INDUCTOR
					L2201	53010002	22μH
					L2202	53010003	250μH
		TRANSFORMER					
T2101~2104	55003319	IFT		#220347			MINI CONNECTOR
					J2201	67130001	5048-13A
	91100008	Wrapping terminal C					
					TP	91100008	Wrapping terminal C
		MINI CONNECTOR					
J2101	67130001	5048-13A					



- S3A~H MODE SW
- ① LSB ② USB
 - ③ CW-W ④ CW-N
 - ⑤ AM ⑥ FM
- S4A~D MEMO SELECT
- VFO FIX
 - SIMP
 - TX MR
 - RX







AMGC

NB UNIT (PB-1866 NO.17...)

FILTER UNIT

TX BV

AM CONT UNIT PB-1898 (NO.23...)

BOOSTER UNIT (PB-1859 NO.8...)

FIX UNIT PB-1750

54 NO.2...

155Y

0730

-D05, D07 2209

(NO 001 25C372Y

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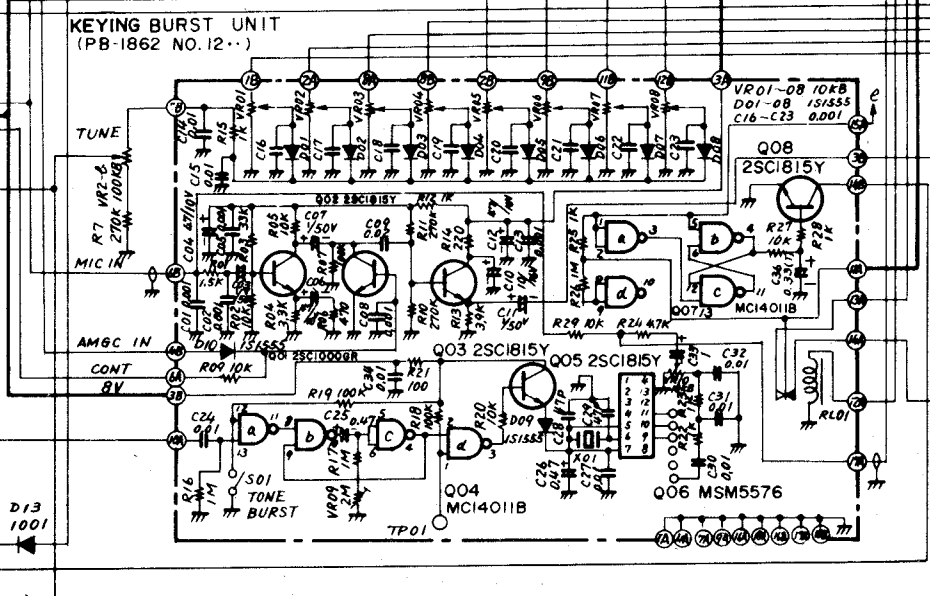
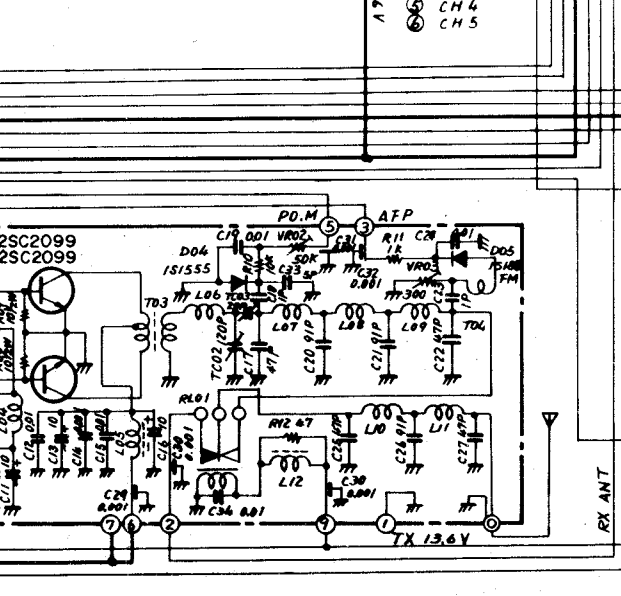
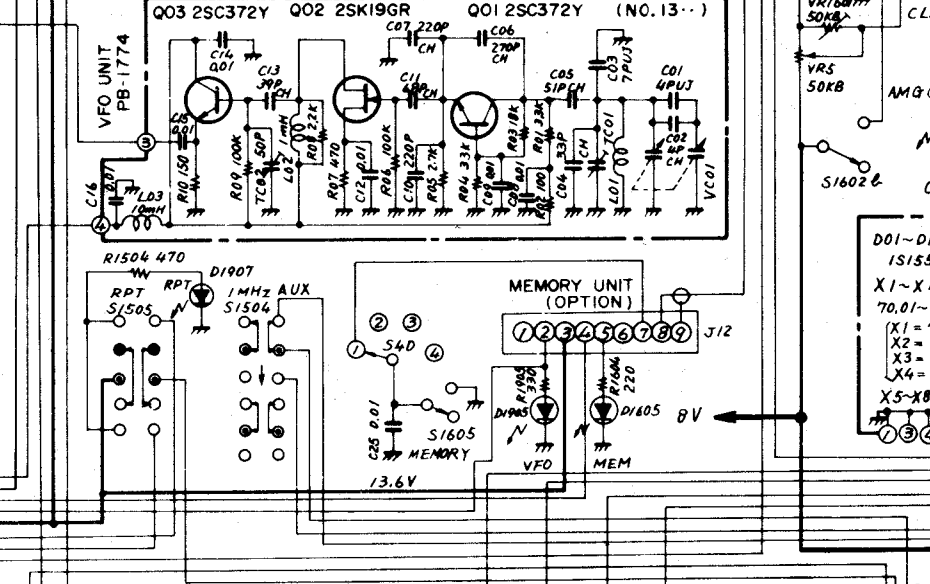
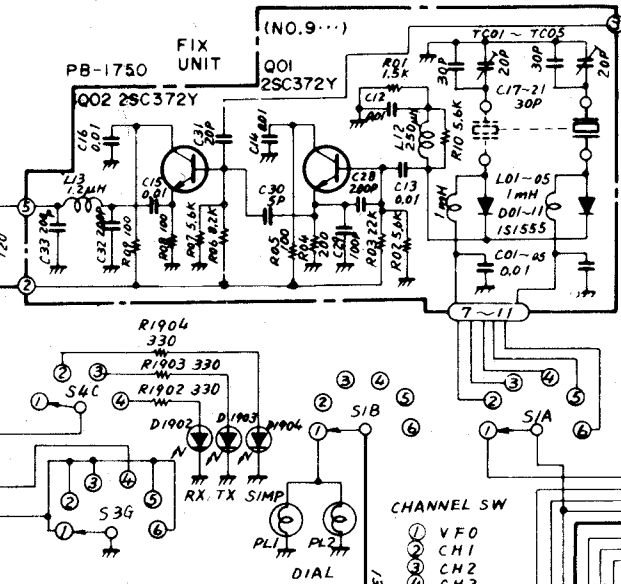
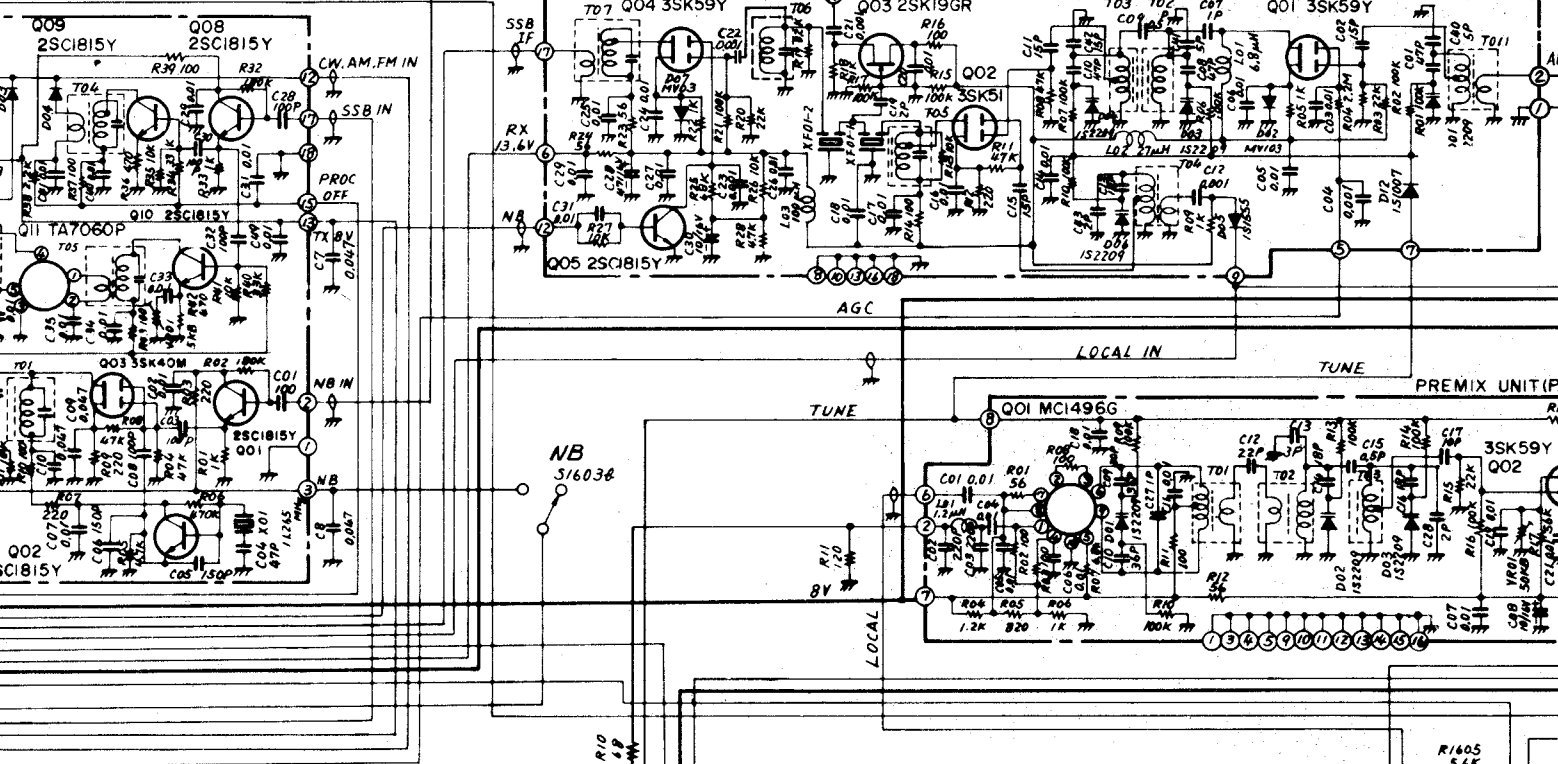
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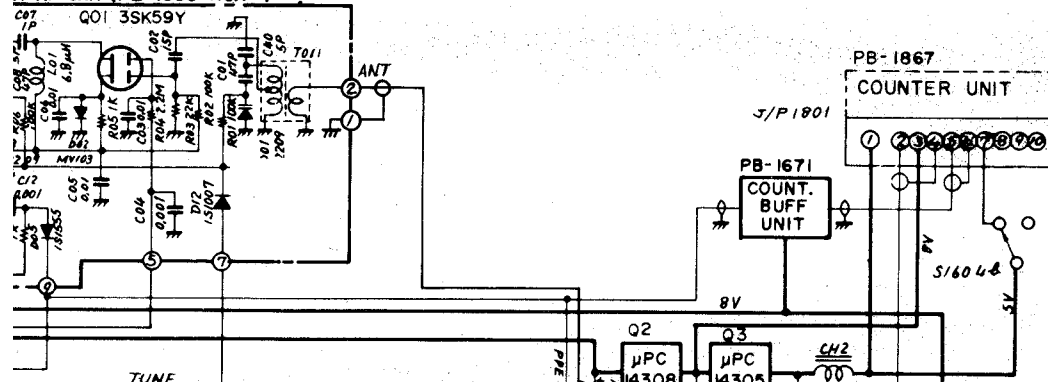
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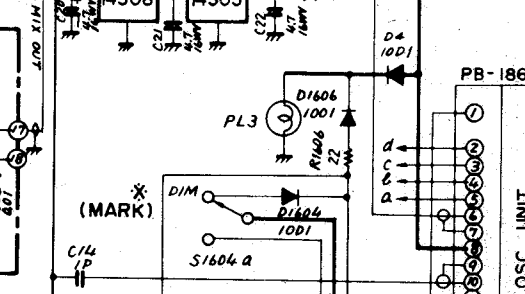
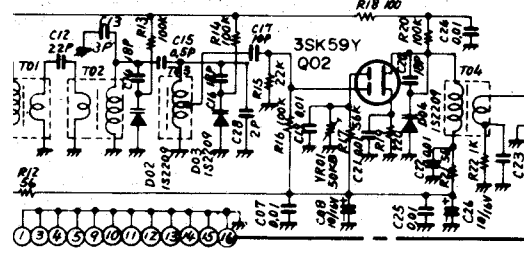
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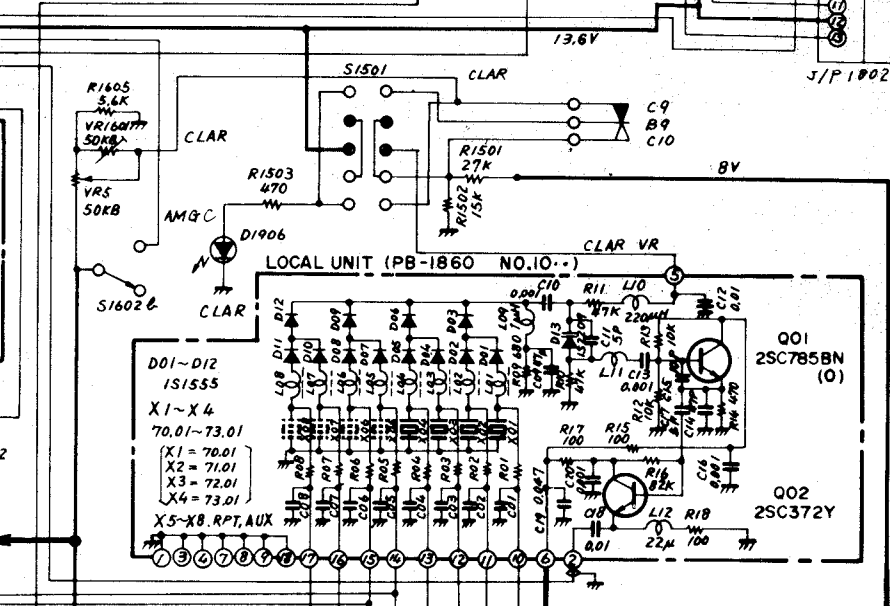
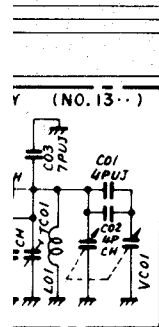
X RF UNIT (PB 1853 NO.1...)



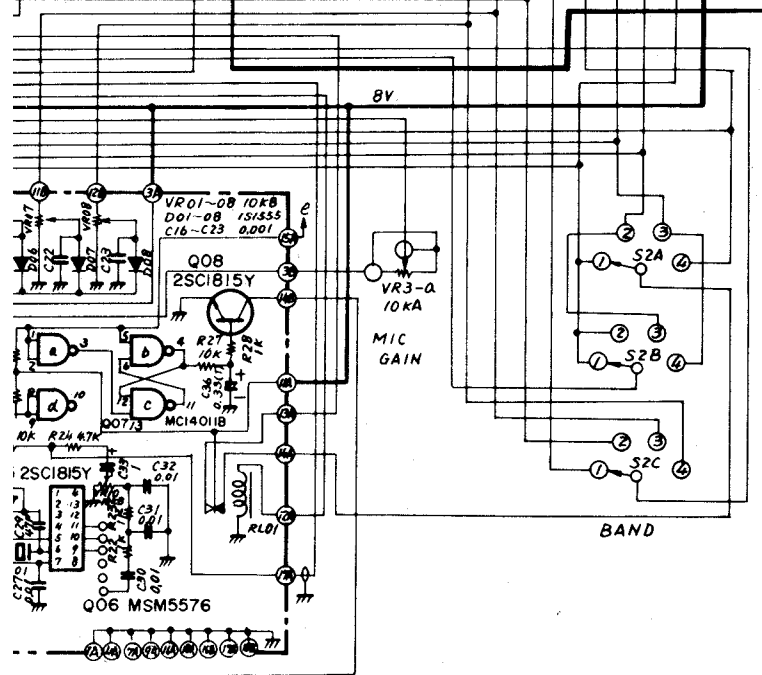
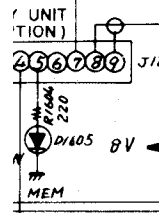
PREMIX UNIT (PB-1861 NO.1...)



Y (NO. 13...)



UNIT (NO. 13...)



- S2A-C BAND SW
 ① 50-51 ② 51-52
 ③ 52-53 ④ 53-54

- NOTE
 1. ALL RESISTERS IN Ω 1/4W±10% UNLESS OTHERWISE NOTED
 2. ALL CAPACITORS IN μ F UNLESS OTHERWISE NOTED
 3. THE PARTS NUMBER WITH THE NUMBER SHOWN BELOW THE PRINTED BOARD DESIGNATION
 * ANALOG TYPE

FT-625RD
CIRCUIT DIAGRAM

